AGRICULTURE IN THE UNITED STATES

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A SPECIAL REPORT SUPPLEMENTING THE EXHIBIT OF THE UNITED STATES DEPARTMENT OF AGRICULTURE AT THE IBERO-AMERICAN EXPOSITION SEVILLE SPAIN 1929

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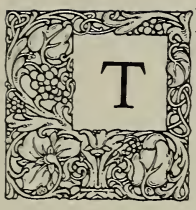
FOREWORD

By William M. Jardine, Secretary of Agriculture



HOUGH from the dawn of history migrations have occurred, the discovery and settlement of America had special significance from an agricultural standpoint. Besides greatly increasing the geographical extent of the civilized world known at that time, the voyage of Columbus, sailing under the flag of Spain, opened new agricultural opportunities.

The discovery meant, in the course of time, new homes and farms for those having pioneering instincts. It meant different types of farming under new conditions. It led to new methods and the consequent development of new equipment. Invention and industry have bridged the ocean so that communication and commerce flow rapidly in both directions on a vast scale.

No longer a terrifying barrier, the Atlantic Ocean has become a convenient lane for shipping and pleasure travel. Yet throughout these changes the United States has preserved the blood and the spirit of the earlier settlers and has been keenly interested in the agriculture of other nations.

The American people are fully mindful of the origin of their present vast agricultural industry. The first domestic animals reached American shores in a ship flying the Spanish flag. Other importations soon followed. To-day the United States still continues to import from the Old World choice breeding animals with which further to improve American livestock.

A similar condition exists with respect to many field crops and other plants. In preparing its exhibit for the Ibero-American Exposition the United States Department of Agriculture has selected, for the most part, subjects in which the Latin peoples and the United States have a common interest. This booklet, which supplements the exhibit, represents an endeavor on the part of the department to

portray the present development of crop production and stock raising in the United States.

I hope that this booklet may influence people in other countries to visit the United States and observe its farms, plantations, ranches, and other agricultural industries more closely. Besides the staple crops mentioned, there are scores of others raised on a smaller scale, or used largely for domestic or local purposes. The forests and wood lots of the United States are also a part of its agriculture, supplying building material and fuel, and providing grazing for millions of animals.

For the information of persons interested in the technical phases of agriculture, the United States Department of Agriculture has issued many publications which it exchanges with foreign investigators interested in similar work. The department also invites foreign scientists to visit its offices and laboratories.

I trust that, after the Ibero-American Exposition has closed, this booklet may serve as a souvenir of the occasion, may aid in the continuation of friendly relations, and may help to bring about a wider understanding of agriculture in the United States.

OUTLINE OF AGRICULTURE IN THE UNITED STATES

HE agricultural industry of the United States is noteworthy for its large extent geographically, its wide range of products, varying types of soil conditions, and wide variations in temperature, altitude, and rainfall. These conditions have resulted in the development of many types of farming and specialized crops in various parts of the country. In some instances the products raised in greatest quantity have impressed their names on the regions, resulting in such names as the Corn Belt, the Cotton Belt, and the range livestock area.

The agricultural industry of the United States includes general farms which raise a wide diversity of products, and specialized farms devoted, as the case may be, principally to grain, cotton, tobacco, fruits, vegetables, livestock, poultry, or other agricultural commodities.

Compared with many other countries, agriculture in the United States is noteworthy for the extensive use of machinery and implements, particularly in the growing and harvesting of grain and other bulky field crops. In addition to the use of horses and mules as motive power, there are large numbers of tractors and stationary engines as well as motor trucks for heavy hauling and marketing. Milking machines have become common equipment on many dairy farms, and electricity is being used in an increasing extent for farm power and lighting.

This booklet discusses briefly several of the principal field crops and classes of livestock produced in the United States.

Readers who desire more comprehensive information may address inquiries concerning agricultural topics to the United States Department of Agriculture, Washington, D. C., U. S. A. Such correspondence receives prompt attention by the administrative officers and technical specialists of the department.

FIELD CROPS

CORN

PRODUCTION

CORN (*Zea mays*) was the earliest cultivated crop on the American farm. The first colonists settling in Virginia and in Massachusetts found the Indians producing corn and preparing various foods from it. From them the colonists learned how to plant, cultivate, and utilize this grain. To-day corn is the most important crop in the United States, in both acreage and value. Grown in every State, it reaches its preeminence in the Corn Belt, that strip of productive land stretching from the Ohio River westward to the Missouri River and beyond. (Fig. 1.) More than 100 million acres were planted to corn in 1928 and nearly 3 billion bushels were produced. Three-fourths of the world's corn crop is produced in the United States.

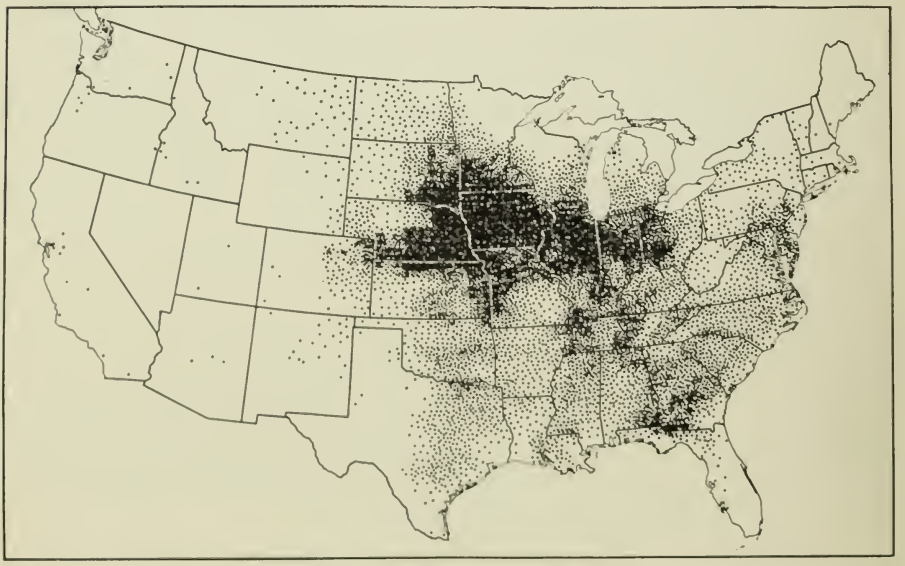


FIG. 1.—Corn acreage of the United States (each dot represents 10,000 acres). The Corn Belt is indicated rather clearly by the blackened area extending from western Ohio to southeastern South Dakota and thence southward along the Missouri River. The total acreage here shown, based on the census of 1924, is 98,402,000 acres

FIG. 2.—Corn improvement by selection. Gathering seed ears from standing corn makes possible the selection of good, typical ears from vigorous plants

Varieties.—Corn varieties to meet varying requirements have been developed by selection and breeding. (Fig. 2.) The great bulk of the corn crop is made up of dent varieties (*Zea mays indentata*) in yellow, white, and mixed colors, and flint varieties (*Zea mays*

FIG. 3.—Corn requires frequent and thorough cultivation

FIG. 4.—In the Corn Belt the greater part of the corn crop is husked from standing stalks

indurata) of varying colors. Sweet corn (*Zea mays* var. *saccharata*) is extensively grown for use as a fresh vegetable, as well as for canning. Practically every farm home and market garden produces sweet corn in season, and, in addition, more than half a million acres are grown annually to supply green corn for packing from 15 to 20 million cases of canned corn.

Sweet corn differs from field or fodder corn in that the grain has a larger sugar content and a relatively small amount of starch. Sweet corn reaches edible maturity in from 72 to 85 days. It can be grown only in localities having a frost-free period of at least 100 days and with comparatively high temperature during the flowering period of the plant.

Pop corn (*Zea mays everta*) kernels, when heated, pop open, owing to the sudden expansion of moisture in the starchy centers causing the kernels to turn inside out. Two distinct types—rice, with sharp-beaked kernels, and pearl, with smooth, rounded kernels—are subdivided into many varieties. The popped kernels are used as a confection and comfit.

Culture and Uses.—Corn is planted in rows and cultivated. (Fig. 3.) The two-horse walking cultivator is one of many types used in the United States. Both sides of a row of corn plants are

cultivated at one time. Two-row cultivators are also extensively used. Most of the corn crop is allowed to mature on the stalk and is gathered by hand. (Fig. 4.) A good worker will husk 100 bushels or more a day in this manner. Machines have been developed for husking corn from standing stalks. Farm practices in handling the mature corn crop vary in the different sections of the country. In the Northern and Northeastern States and in mountain areas cutting and shocking is the usual practice, especially where dairying is followed. Corn is cut in September in most parts of the country. After drying in the shock the ears are usually husked (fig. 5) and used as grain. The stalks are then used as feed for livestock.

Corn ears are commonly stored in slatted structures called corncribs. (Fig. 6.) Mechanical dumps and elevators save time and labor in unloading and storing corn ears in these cribs, which often are of considerable size.

Especially in dairying sections a large part of the corn crop is cut and used for silage. The whole plant is cut by hand or with corn harvesters (fig. 7) just before it is mature or before it will be killed by frost, and taken to the silo. A silage cutter reduces the corn to small pieces, which are blown into the top of the silo (fig. 8), where the cut corn is thoroughly packed by tramping. It goes through a process of fermentation and is used as stock feed. The product of about 4 million acres of corn is used annually in this way.

Fig. 5.—Husking ears of corn from the shock

MARKETING AND COMMERCIAL USES

The value of the corn crop to the American farmer is greater than that of any other crop; in fact its value is greater than the combined value of all the other grains. About 85.5 per cent of the corn crop is fed to livestock and poultry, and 15 per cent of this is fed largely as silage. About 10 per cent is used as human food, about 1.5 per cent is exported, and 3 per cent is used for other purposes. The commercial products made in the largest quantities from corn kernels are corn flour, corn sirup, corn oil, corn-oil cake, and corn meal.

FIG. 6.—Mechanical dumps and elevators save time and labor in filling corncribs in the Corn Belt

Besides being used as food for man and beast, corn, including the cobs and stalks, has entered in some form into nearly every imaginable industry, including the radio, the telephone, and the manufacture of lumber, paper, starch, candy, soap, glue, varnish, oilcloth, automobile tires, cellulose, paint, and even fireworks.

Shelled corn entering into commercial channels is practically always sold and bought by grade. The grades are promulgated by the United States Department of Agriculture and enforced under the United States grain standards act. For the purposes of the grades, corn is divided into three classes, namely, white corn,

FIG. 7.—Corn harvester cutting corn and delivering the stalks to be hauled to silage cutter

yellow corn, and mixed corn. In each class there are six numbered grades and a "Sample" grade. Grade 1 represents the best grade and brings the highest price. The grades are based on the following factors of condition and quality: Test weight per bushel, moisture content, damaged kernels, and admixtures of foreign material

FIG. 8.—Filling the silo. A typical farm scene in the United States

and cracked corn. The "Sample" grade is corn which will not meet the requirements of any of the six numerical grades.

At country points the buyer usually determines the grade, but at the large terminal markets corn is graded by inspectors licensed by the United States Department of Agriculture, but these inspectors are in State employ or in that of the grain exchanges in the different markets.

Methods of Marketing.—The local marketing conditions determine the way the farmer sells his grain. He may sell to any of the following purchasers: Elevators, warehouses, track buyers, feeders, "scoop shovelers," interior brokers, retailers, representatives of terminal-market grain dealers, and buyers for mills or other converters. The largest quantity is sold to country elevators which in turn sell to other agencies, principally to the terminal elevators, that is, elevators receiving 1,000 cars or more a year, located in the terminal markets. Chicago is the greatest distribution center for corn in the United States.

The farmer does not always desire to sell immediately after harvest. He may wish to hold his grain for a higher price which he expects to receive later in the season. If he has not storage space on the farm he may deliver his corn to the local elevator and, for a small sum which is usually charged by the elevator, store his grain until he desires to sell. It is customary in these circumstances to fix the grade at the time of delivery to the elevator; the price, of course, is not determined until the farmer desires to sell.

Corn is usually bought at the terminal markets by (1) millers, feed manufacturers, or other converters, or (2) dealers and shippers, including particularly the great terminal elevators. Those in the first group buy for the purpose of converting the raw material into some form of grain product. Those in the second group purchase with the expectation of deriving a profit from subsequent resales.

Foreign Trade.—The export demand for corn has never been large; the largest export movement in the last 20 years was in 1921, when 179,374,000 bushels were exported. From July 1, 1927, to June 30, 1928, only 18,390,000 bushels were exported, which was only seven-tenths of 1 per cent of the whole crop. In view of the size of the crop, export demand is a very minor factor in the corn markets. Corn exported from the United States goes mostly to Canada, Mexico, the Netherlands, the United Kingdom, and Cuba, where it is used principally as feed for dairy cattle

and other livestock. Imports of corn are almost negligible, the greatest amount coming from Argentina. It is used principally in the industries. A small amount is used as poultry feed.

WHEAT

PRODUCTION

Wheat is one of the most important crops of the United States, outranked in value only by corn, hay, and cotton. About one-

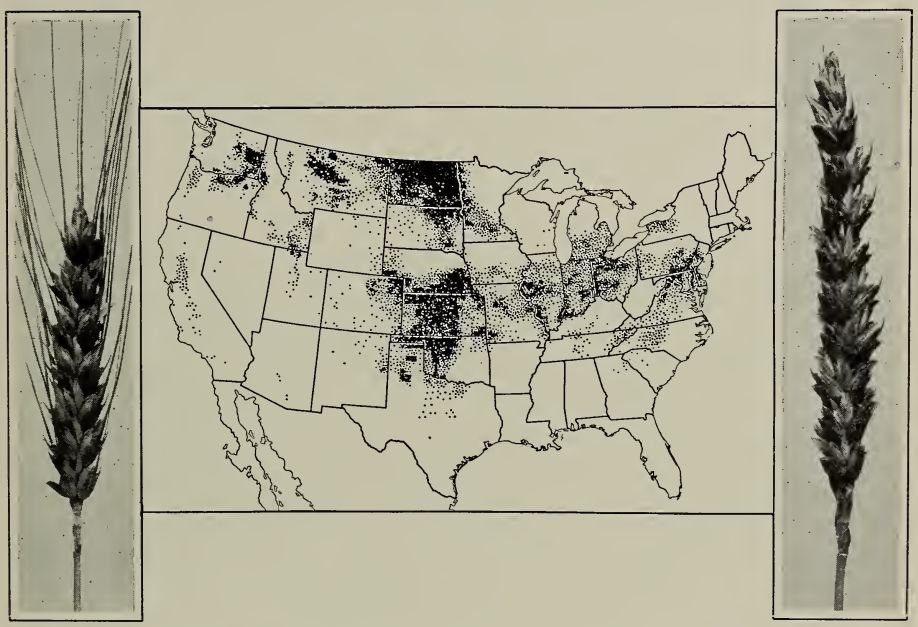


FIG. 9.—Total wheat acreage based on the last complete census, 1924. Each dot represents 5,000 acres. Spring wheat is grown in the north-central area. More than 10,000,000 acres, or about one-fifth of the total wheat acreage of the country, were sown to Marquis (right), the principal variety. In other parts of the country winter wheat (fall sown) is grown. The central area produces hard red winter wheat, of which Turkey (left) is the principal variety. More than 14,000,000 acres of hard red winter wheat, or about one-third of the total wheat acreage of the country were grown in 1924

third of the farmers grow wheat, which is the great bread crop of the country. Wheat and wheat flour constitute a very important part of our international trade. In value of crops exported wheat stands second only to cotton.

On the wheat-acreage map (fig. 9) the spring-wheat area is in the north-central part. Marquis, the principal variety of spring wheat, is produced on about one-fifth of the total wheat acreage of the country. Durum wheats are produced also in this region.

Winter wheat (fall sown) is grown in the other parts, the central area producing hard red winter wheat. Soft red winter wheat is produced in the humid East Central States. Both spring and fall sown common white wheat are produced in the northwestern and northeastern parts of the country. Club wheat is produced in the dry regions of the West.

Uses of Principal Varieties.—Bread flour of the best quality for light bread is made from the hard red winter and hard red spring wheats (*Triticum vulgare*), produced where the climate is subhumid to dry. Turkey, Blackhull, and Kanred are the most im-

FIG. 10.—A field used for the breeding and testing of varieties of wheat. Different selections and varieties are grown, cut, and threshed separately

portant varieties of the hard red winter group. Marquis, Kota, Preston, Ruby, and Ceres represent the most important varieties of the hard red spring group. Flour for pastry and bread is made from the soft red winter wheats (*Triticum vulgare*). Fulcaster, Fultz, Mediterranean, Poole, Trumbull, and Leap are the most important varieties of this large group.

Durum wheat (*Triticum durum*) is grown and used for the manufacture of semolina and for export. The United States Department of Agriculture was largely responsible for introducing and establishing this wheat in the United States within the last 25

FIG. 11.—A 50-foot sectional spike-tooth harrow preparing land for wheat on a large, western ranch

years. The Kubanka, Kahla, Peliss, and Arnautka varieties were introduced from foreign countries, others having been developed by selection.

FIG. 12.—Drilling in wheat following corn, a common practice in the east-central part of the United States

Common white wheats (*Triticum vulgare*) are used largely for pastry flours and for export. The most important of the many varieties of this group are Goldcoin, Baart, and Pacific Bluestem.

FIG. 13 (above).—Harvesting with binder which cuts the wheat and ties it into bundles. Carriers are usually attached to binder and three or four bundles are dropped together

FIG. 14 (at left).—Bundles of wheat in a shock where they are allowed to dry. Two men can usually shock bundles of grain as fast as the binder delivers them

Club wheats (*Triticum compactum*) of both red-kerneled and white-kerneled varieties are grown on the dry lands of the West, where they stand up well and do not shatter. Some are spring sown, others fall sown. Hybrid 128, developed at the Agricultural Experiment Station of the State of Washington, is the leading variety.

Breeding.—The breeding, selecting, and testing of varieties of wheat are conducted at experiment stations in the principal wheat-

growing States. Different hybrids and selections are grown, harvested, and threshed separately. (Fig. 10.) From the thousands of such rows a few superior strains of wheat are selected, the best being finally increased and distributed to American farmers. The Kanred, Marquis, Forward, and other valuable varieties were developed in this way.

FIG. 15 (above).—Threshing wheat from shocks. After drying in the field the shocks are hauled to a threshing machine, which separates the grain from the straw and chaff

FIG. 16 (at right).—Sacking threshed grain. Another method is to haul grain away unsacked, to be stored in bulk

Cultivation.—Farm practices in the preparation of land, planting, harvesting, and threshing vary greatly in the different wheat-producing regions of the United States. Large farming implements, mostly tractor-drawn, are used to advantage on the farms and ranches of the West (fig. 11) where the land is sufficiently level and the farms are of adequate size. Wheat is sown by a grain drill. (Fig. 12.) A common practice in the east-central section of the country is to drill in wheat on land disked after corn has been

FIG. 17.—Extensive wheat areas of the far West are harvested with "combines," by which the grain is cut and threshed in one operation. In recent years tractors have been replacing horses and mules to furnish the power required for these huge machines

cut and shocked. A binder (fig. 13), which cuts the wheat and ties it into bundles, is the implement generally used to harvest the wheat crop. The bundles of harvested wheat are gathered and stood on end in shocks (fig. 14), where they are allowed to dry.

After drying in the field the shocks are hauled to the threshing machine (fig. 15), which separates the grain from the straw and chaff. Sometimes the bundles are stacked in the open or stored in

FIG. 18.—A busy day at a country elevator

FIG. 19.—A terminal elevator and grain yards

FIG. 20.—Taking samples of grain in a barge at a Gulf port as the cargo is being unloaded

barns for later threshing. A machine will thresh from 1,200 to 2,000 bushels of wheat in a day. Threshed grain is either sacked (fig. 16), or hauled away unsacked to be stored in bulk. The average wheat yield in the United States is about 15 bushels an acre. Yields of from 20 to 30 bushels an acre are common, however, and even higher yields are often obtained.

Extensive wheat areas in the far West generally are harvested with "combines." (Fig. 17.) With these machines the wheat is cut and threshed in one operation. From 20 to 30 horses or mules are required to draw these large machines. In recent years tractors have been replacing horses for power. A smaller combine has

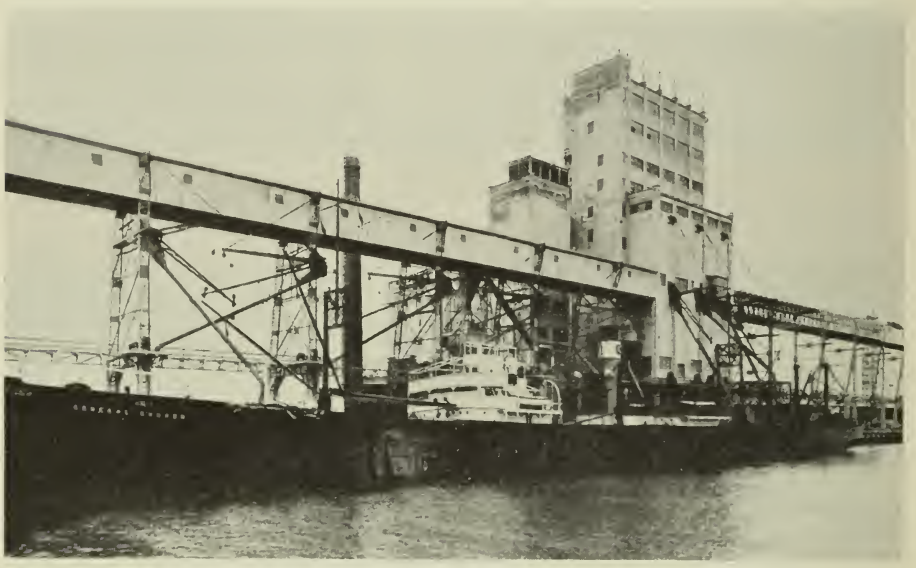


FIG. 21.—Loading ships with grain at an export elevator

been developed which in the last 10 years has largely replaced binders and headers in the central regions and is now rapidly coming into use in the eastern part of the country. The acreage cut and threshed in a day depends on the size of the machine, yield of grain, and length of day. A machine with a 10-foot cut will average about 25 acres a day.

MARKETING AND MILLING

The wheats produced in the United States may be grouped in three subdivisions, from the standpoint of the uses to which they are put. The hard spring and hard winter wheats are essentially

bread wheats; the soft winter wheats are used largely for pastry, biscuits, and to some extent for bread, while the durum wheats furnish semolina, which is used in the manufacture of such products as macaroni and spaghetti.

METHODS OF MARKETING

The movement from the farm begins promptly after harvest and continues in large volume for a period of from two to three months. (Fig. 18.) There is not sufficient farm storage to care for the entire crop, and this movement places a heavy burden on the transportation and terminal elevator facilities, which must absorb the shipments from the country either for direct distribution to milling centers and to ports for exportation or to be held in storage to be distributed for consumption throughout the remaining months of the year.

The movement from the farm to the consumer involves a number of agencies, of which the most important are the country elevator, railroad transportation, grading and inspection, local mills, terminal mills, interior terminal elevators and warehouses, grain exchanges, banks, telegraph and telephone, inland water transportation, seaboard terminal elevators, and ocean-going vessels. (Figs. 19 to 21.)

Official Standards.—Because of the distances which may separate buyers and sellers of wheat, not only within the United States but also between this country and foreign countries, one of the essential features of merchandising is a system of inspection and grading by qualified and unbiased official inspectors. By virtue of an act of Congress passed in 1916, known as the United States grain standards act, this work has been entrusted to the United States Department of Agriculture for administration.

Under this law the official grain standards of the United States were promulgated in 1917 and are now in use throughout the entire country as well as in our export trade. The standards provide specifications for the several factors which indicate quality and condition in wheat, such as class, test weight per bushel, moisture content, freedom from other grains, and freedom from damaged grain and foreign materials. These standards or grades are in force at all ports where wheat is exported in quantity to foreign countries and the inspection work is performed by persons licensed by the United States Department of Agriculture. Their inspection work is subject to Federal supervision and appeal. The

confidence in the integrity of the official inspection certificates as commercial paper is illustrated by the fact that practically all contracts provide that the official certificate shall be accepted as final with respect to quality and condition.

Since the United States produces surplus wheat, very little wheat is imported for domestic consumption. Many mills, however, import wheat for milling and export the resultant products to foreign countries.

COTTON

PRODUCTION

Cotton is the greatest commercial crop of the United States, all the lint and most of the cottonseed being sold from the farm. In total crop value it is second only to corn, when the value of both

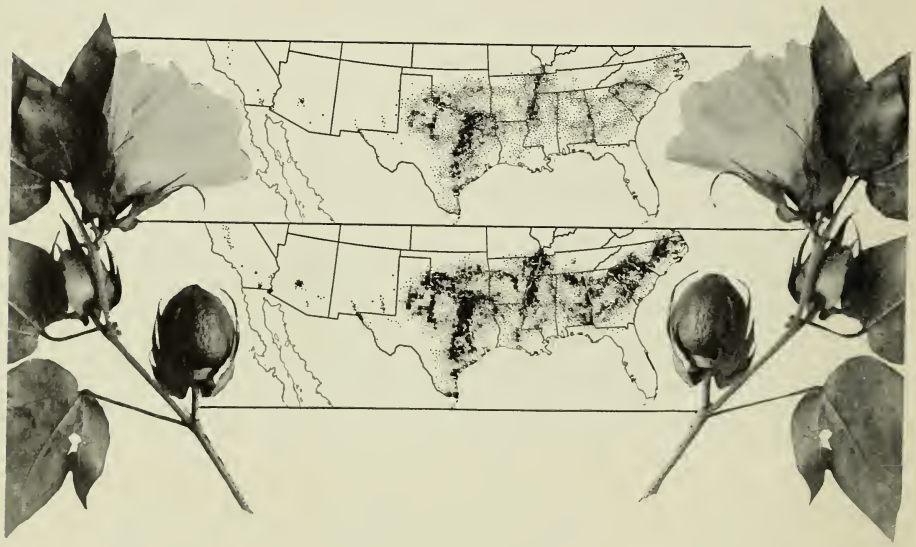


FIG. 22.—The Cotton Belt in southern United States is the world's greatest cotton-producing region. The latest agricultural census records a total of 39,204,000 acres on which were produced 13,683,000 bales of cotton lint. In the upper map each dot represents 10,000 acres. In the lower map each dot represents 2,000 bales

the lint and seed of cotton is considered. Exports of raw cotton also usually exceed in value the exports of any other crop that is grown in the United States.

The Cotton Belt of the United States (fig. 22) extends from southeastern Virginia through North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas,

Louisiana, Texas, and Oklahoma. In recent years commercial production has extended into southwestern Kentucky, southern Illinois, southeastern Missouri, western Texas, New Mexico, Arizona, and California.

Classes and Types.—In the United States the cotton crop is broadly grouped into four general commercial classes (figs. 23 and 24), described as follows:

(1) Sea-Island cotton: This cotton has a fine, strong fiber, from $1\frac{1}{2}$ to 2 inches or more in length. That formerly grown on the islands and mainland along the coast of South Carolina, with a fiber 2 or more inches long, was considered the most valuable of the world's cottons. Since the advent of the boll weevil commercial production has declined rapidly and is now confined almost entirely to the British West Indies, Porto Rico, and Peru.

(2) Egyptian cotton: This cotton has a fine, silky, strong fiber from $1\frac{3}{16}$ to $1\frac{3}{4}$ inches in length. Most of the crop comes from Egypt. A special variety produced in the United States and known in the trade as Pima produces a fiber from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches long. Production of Egyptian cotton in the United States is confined chiefly to the Salt River Valley in Arizona.

(3) Upland long-staple cotton: This cotton includes staples from $1\frac{1}{8}$ to $1\frac{3}{4}$ inches in length. It is produced almost entirely in the United States, principally in the Delta of the Mississippi, and in the Red River, Pecos River, and Rio Grande Valleys of Texas and New Mexico, and in parts of Arkansas, Arizona, California,

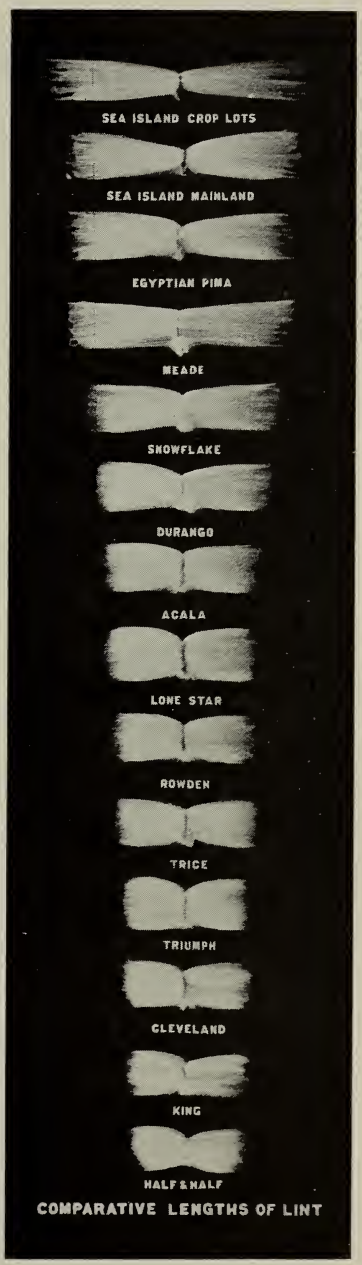


FIG. 23.—Comparative length of lint of some American-grown varieties of cotton

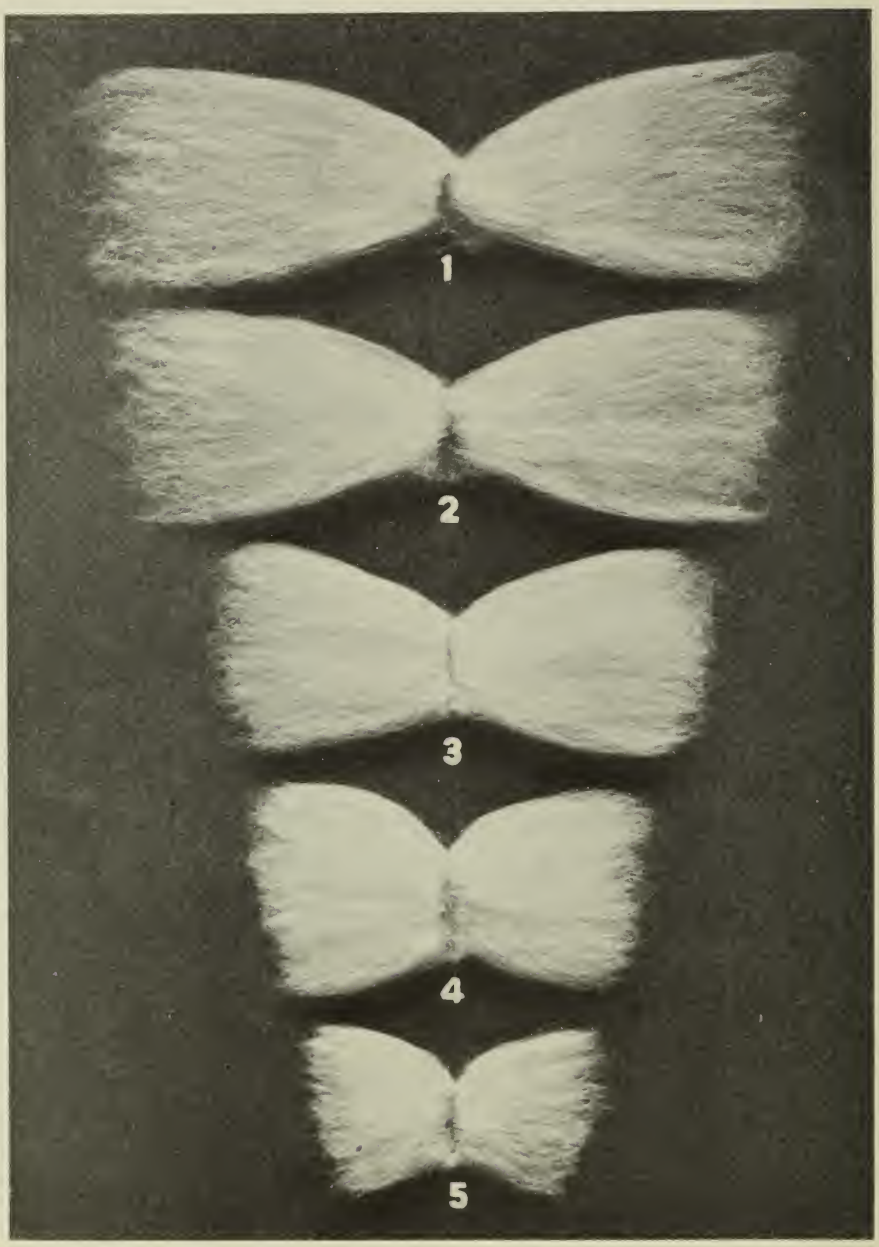


FIG. 24.—Principal commercial types of cotton (combings natural size): 1, Sea Island (*Gossypium barbadense*); 2, Egyptian (*G. barbadense*); 3, upland long-staple (*G. hirsutum*); 4, upland short-staple (*G. hirsutum*); 5, Asiatic (*G. herbaceum* and related species). The first four only are grown in the United States. The standard "American Middling" grade is upland short-staple type

FIG. 25.—Young cotton being cultivated with a disk harrow. Shallow, clean cultivation is one of the essentials recommended by the cotton council

and South Carolina. It occupies a commercial position between the longer-staple Egyptian and upland short staple. The annual production is about 1,500,000 bales.

(4) Upland short-staple cotton: This cotton constitutes about 90 per cent of the cotton crop of the United States and about 70 per cent of the world's crop of short-staple cotton of approximately 20,000,000 bales. Many varieties, differing in habits of growth, size of bolls, earliness, abundance, and length and uniformity of staple, are grown in the Cotton Belt. Staples are from five-eighths of an inch to 1 inch long, and some varieties reach $1\frac{1}{16}$ inches in length when grown under favorable conditions.

Necessary Climatic Conditions.—A frostless season of from 190 to 200 days and an average temperature of about 77° F. during the summer months appear to mark the northern limits of commercial cotton production. The southern part of the Cotton Belt has a frostless season of 250 days or more and an average summer temperature of 85° F. or higher. The average annual rainfall in the belt where cotton is grown without irrigation ranges from 15 to 20 inches in parts of western Texas and Oklahoma to 60 inches in southern Mississippi. Ideal conditions for cotton production include a precipitation of from 30 to 40 inches a year, about half occurring in the winter and early spring, and the

rest distributed throughout the growing season, and the fall months dry.

General Farm Practices.—Times, methods, and costs of preparing land, and of planting, cultivating, picking the cotton, and preparing it for market vary much in different parts of the South. Wherever grass or weeds grow profusely in the fields the cultivation of cotton requires from one to three hand hoeings during the season. With one mule and the necessary implements a man can plow, chop, and hoe from 10 to 20 acres. In the level, black lands of Texas the amount of hoe work is comparatively small; four-mule implements are frequently used for preparing the land and two-mule implements for cultivating it. (Fig. 25.) The newest form of cotton cultivation has developed in the irrigated districts of the Southwest. Here the essentially distinctive features are leveling the land, so that the entire field may be irrigated uniformly, and regulating the water so as to obtain the desired results.

The cotton council of the United States Department of Agriculture and the Association of Southern Agricultural Workers unite in emphasizing the following points in recommendations for the improvement of cotton production:

(1) Planting of cotton only on fertile, well-drained land.
(2) A well-prepared, settled seed bed.
(3) Liberal fertilization and increased use of quickly available nitrogen.
(4) Purebred, selected seed.
(5) Raising one variety of cotton in a community.
(6) Full stands.
(7) Closer spacing of plants.
(8) Shallow, clean cultivation.
(9) Practice of approved methods of weevil control.
(10) Careful picking and ginning.
(11) Prevention of damage by proper care of cotton on farms.
(12) Rotation of crops and the use of legumes for soil improvement.

Picking and Ginning.—When mature and dry, cotton should be picked clean (fig. 26) and kept dry until ginned. If not thoroughly dry when ginned, the staple is cut and damaged, sometimes to the extent of several cents a pound.

The only practicable way to protect the purity of the seed of improved varieties of cotton is by means of organized communities devoted to the production of only one variety of cotton, with the gin as the community center. (Fig. 27.) When all the farmers understand the behavior of one variety, improved methods of culture are more easily followed in relation to differences in soil, season, and time of planting, as well as to the control of insect pests and diseases, labor supplies, ginning, handling, warehousing, financing, and marketing of the crop.

FIG. 26.—Picking cotton on a typical southern farm or plantation

FIG. 27.—Hauling cotton to the gin

Cotton is ordinarily picked from the boll by hand. In some cases it is gathered in a crude way mechanically, but this latter method is by no means general. After the cotton is picked it is loaded into

FIG. 28.—Classing room, United States Board of Cotton Examiners at New Orleans, Louisiana

a wagon which holds about 1,500 pounds of seed cotton. It is then taken to the local gin, where the seeds are removed, leaving about 500 pounds of lint or fiber, which is packed in a box known as a press. The bale coming from the gin usually has six ties or iron bands weighing about 9 pounds, and 6 yards of covering, usually jute cloth, weighing from 12 to 13½ pounds, or a total of 21 to 22½ pounds of "tare." The size of this bale is approximately 54 by 27 by 48 inches, and the density from 12 to 15 pounds per cubic foot.

The farmer may sell the bale after ginning or he may hold it for later sale, in which case he usually brings it back to his farm or has it stored in a warehouse. If he decides to sell immediately he takes his cotton to the nearest local market. Later it is sent to a concentration point where there is a cotton compress, through which the bale passes and is compressed. A density of from 22 to 28 pounds per cubic foot results from compression by a standard compress. A high-density compress may compress the bale to a density of from 28 to 40 pounds per cubic foot. At the compress the cotton is classified into lots of even-running grades and staples.

Standards and Classification.—The Division of Cotton Marketing of the United States Department of Agriculture is charged under the cotton futures act, (1) with the establishment of standards for determining the quality or value of cotton, (2) with the classification of all cotton tendered on future contracts, and (3) with the designation and supervision of bona fide, spot markets from which to determine the actual commercial differences paid for the several grades of cotton, which differences under the terms of the act must be used in settlements of future contracts.

Under this law the division maintains boards of cotton examiners at New York, New Orleans (fig. 28), Houston, and Galveston. It maintains a quotation service and a system of inspection of spot markets so as to verify the accuracy of quotations received from the designated markets. It also maintains a board of final review examiners at Washington, D. C., for the purpose of reviewing the classifications made by the several boards.

FIG. 29.—Preparation of copies of the universal standards for the grade and color of American cotton

Under the cotton standards act the division is charged with the establishment of standards for all forms of cotton and cotton linters, with the preparation and distribution of copies of such standards (figs. 29 and 30), and with various other related duties.

The cotton merchant at the concentration point is usually an exporter, who buys cotton for sale to foreign countries. Export sales are usually made to importers and mills in foreign countries through buying brokers. Some American shippers, however, have contact with and make direct sales to foreign mill buyers.

FIG. 30.—Preparation of copies of the official standards of the United States for the grade and character of American cotton linters

The exportation of American cotton to foreign countries amounts to approximately 8,000,000 bales a season, of which from about 300,000 to 350,000 bales find their way to Spain. Almost all the cotton shipped to Spain from the United States goes to Barcelona. From there it is distributed to Spanish cotton-manufacturing centers.

There is, of course, considerable expense in moving cotton from the farms of the United States to the mills in Spain, such as freight, insurance, interest, commissions, and exchange, besides the allowance for tare, which represents the covering and ties on the bale. The freight rate from American ports to Barcelona amounts, in itself, to about $2.50 a bale, though it is flexible and varies somewhat from season to season. The American cotton crop for the season 1927–28 was equivalent to 12,956,043 500-pound bales, and the average price for middling cotton in 10 important southern cotton markets for that season was 19.72 cents a pound.

TOBACCO

PRODUCTION

Tobacco (*Nicotiana tabacum*) is one of the crops that the New World gave to the Old. When Columbus discovered America he found the natives growing and using tobacco, and early explorers took back with them specimens of the plant and its seed.

The early settlers soon learned from the Indians the cultivation and use of tobacco. Its use spread in Europe, and the crop became a source of revenue which enabled the early colonists to purchase

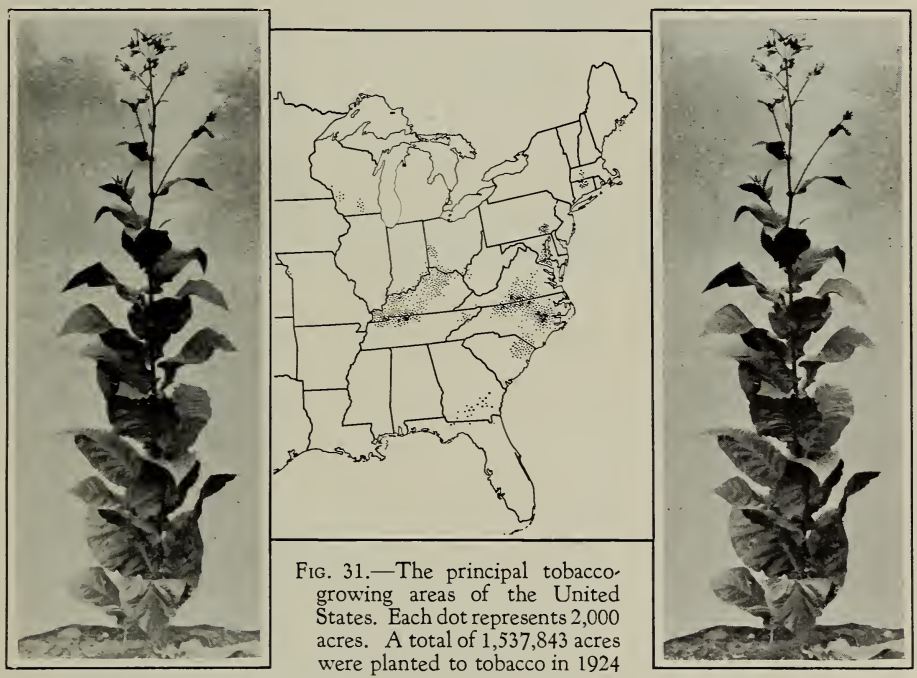


FIG. 31.—The principal tobacco-growing areas of the United States. Each dot represents 2,000 acres. A total of 1,537,843 acres were planted to tobacco in 1924

the necessary supplies from the home country. From this small beginning tobacco production has developed into an important industry. The United States produces approximately one-third of the world's output of tobacco.

The crop is grown in comparatively limited areas of the United States which possess the necessary soil and climatic conditions for growing tobacco of superior merit. (Fig. 31.) The production of tobacco in a given year is much affected by the prevailing weather conditions influencing growth and by the prevalence of diseases and insects. The acreage planted to the crop each year is influenced

FIG. 32.—Apparatus for testing the burning quality of leaf tobacco made into cigars. The pull on each cigar occurs at approximate intervals of 30 seconds, continuing for about 10 seconds. Cigars made from different fillers, binders, and wrappers may be tested until a desired blend is obtained

by the market demands of the preceding seasons and the prices received by the growers.

In colonial days it was customary to grow the tobacco crop on soil from which the virgin forest had only recently been removed. During this period it was found that tobacco of better quality was produced on the virgin soils than on land that had been under cultivation. To-day tobacco must be produced mostly on old, cultivated soils, which makes necessary the extensive use of fertilizers. The control of tobacco-plant diseases, such as mosaic, root rot, and leaf spot, is receiving much attention by pathologists. The control of the several insects which attack the crop is also of prime importance and offers many difficult problems.

Good burning qualities are a very necessary characteristic of high-grade leaf tobacco used for smoking purposes. The burning qualities of leaf tobacco made into cigars can be tested with the apparatus illustrated in Figure 32.

The outstanding, recent development in tobacco production is the marked increase in quantity of the bright, flue-cured or cigarette type of leaf, grown as a result of the enormous increase in

consumption of cigarettes. There has also been a considerable increase in production of Burley, another cigarette type. Production of cigar leaf has been at a standstill, while there has been a sharp decrease in the quantity of dark fire-cured and air-cured types grown.

Tobacco seeds are very small, one plant producing enough for several acres. The best of attention must be given to the young seedling in order for it to develop properly. The seed is sown in a carefully prepared area in the forest or on land which has been sterilized with steam to prevent weed growth and diseases which may destroy the young seedlings. (Fig. 33.) The young plants are covered during their early growth with cheesecloth or glass. When they have reached sufficient size they are transplanted into the field by hand or with a transplanter. (Fig. 34.) The cultivation of the tobacco crop is much the same as for any other hoed crop, the chief purpose being to destroy weeds and to keep the soil in proper tilth. (Fig. 35.) Most tobacco is grown in open field culture (fig. 36), but some of the finer cigar-wrapper leaf is produced under cloth (fig. 37) or slat shade.

After the tobacco plants have developed the proper number of leaves, which depends on the fertility of the soil, the purpose for which the tobacco is grown, and the variety, the plants are topped. Topping is the process of breaking out the terminal bud so that the plant will not produce seed but will be forced to greater leaf

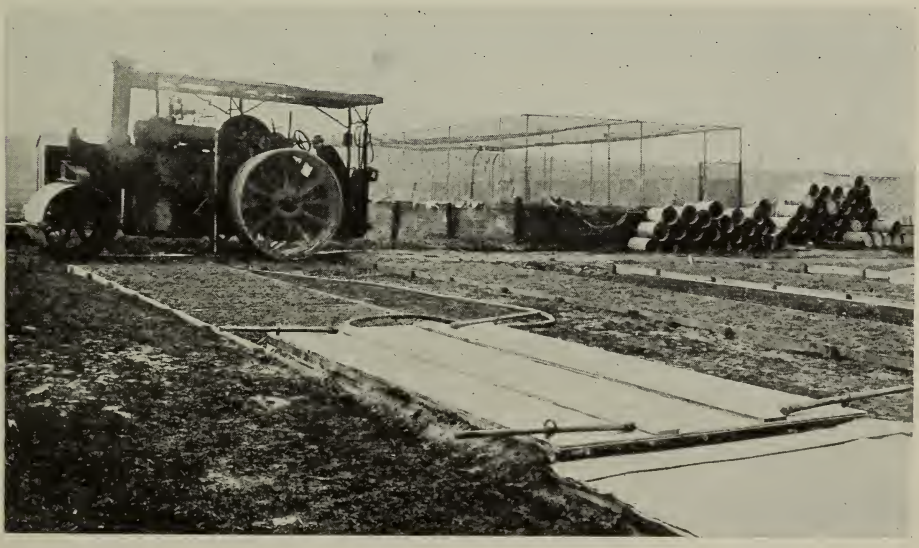


FIG. 33.—Sterilizing soil for tobacco by steam in order to prevent weed growth and diseases

FIG. 34.—Transplanting tobacco in the field. The barrel on the machine supplies water required by the young plants when first set. The rear rod marks the distance for the next row

FIG. 35.—Cultivating shade-grown tobacco plants. This is an interior view of the cheesecloth-covered tobacco field shown in Figure 37

FIG. 36.—Typical American tobacco farm scene. Most of the tobacco is grown in open fields

development. After topping, the lateral branches are removed as they develop.

When the tobacco has reached maturity it is harvested. (Fig. 38.) The method and time of harvesting depend on the type

FIG. 37.—A section of a 200-acre Connecticut tobacco field covered with cheesecloth. The finer cigar-wrapper leaf is produced under cloth or slat shade

and variety grown, but in general the plant is cut, as a whole, near the ground or the individual leaves are picked. After harvesting, the tobacco goes through certain curing processes which vary with the district and type of tobacco produced.

FIG. 38.—Harvesting tobacco. The methods vary with the locality, the kind of tobacco produced, and the subsequent method of curing

METHODS OF CURING

There are three distinct methods of curing tobacco as practiced in the United States, namely, flue curing, fire curing, and air curing. (Figs. 39, 40, 41.) The method of curing, the variety of seed, the type of soil used, and the prevailing climatic conditions largely determine the characteristics of the tobacco produced. Considerable hand labor is necessary in tobacco culture.

MARKETING AND USES

There are six forms in which American tobacco is used, namely, cigars, cigarettes, chewing, smoking, snuff, and by-products. Manufacturers have numerous private brands, each of which represents a different blend. The blending of various tobaccos to suit individual tastes constitutes the fine art of tobacco manufac-

turing. Each form is produced in a wide variety of shapes and sizes, packed in attractive containers.

During the fiscal year ended June 30, 1928, there were made available for consumption in the United States, after the payment

FIG. 39.—Typical flue-curing tobacco barn. Smoke from the fire does not come in contact with the tobacco. Flue-cured tobacco is used largely in cigarette manufacture

of internal revenue taxes, 100 billion cigarettes, 6 billion cigars, 41 million pounds of snuff, and 348 million pounds of chewing and smoking tobacco.

After harvesting and curing, American farmers prepare their tobacco for market by sorting the leaves according to quality, color, and length. The leaves are then tied into small bunches. In this form most of the American tobacco crop is sold at public auction (fig. 42), without being packed in containers. After the tobacco is out of the farmers' hands it is conditioned and packed for storage or export by buyers and dealers. The buyers are representatives of manufacturers, dealers, exporters, and foreign purchasers. Selling on the producers' premises by private bargaining is extensively practiced. Large quantities of tobacco are pooled by the producers and sold through their cooperative associations. In pooling, the tobacco is carefully graded and each farmer shares in the pool sales according to the quantity and grade of his tobacco.

Maryland farmers pack their tobacco for marketing in containers weighing about 650 pounds. It is then stored and sold on sample by sealed bids. On one of the important markets of Virginia, tobacco is officially inspected and graded according to Government standard grades before it is sold at auction.

Grades and Standards.—There are many kinds and qualities of American tobacco. The main divisions, of which there are

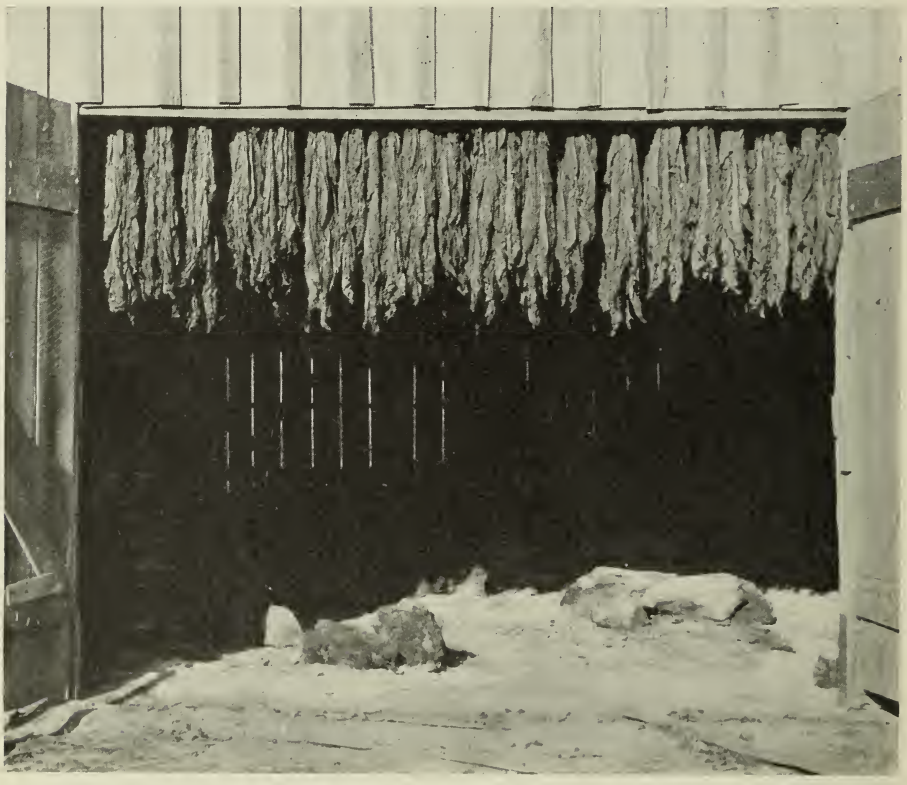


FIG. 40.—Interior of a fire-cure tobacco barn. Smoke from open fires produces a product of characteristic finish and aroma. Fire-cured tobacco is grown principally for export and for snuff

six, are called "classes." Each class covers several broad subdivisions known as "types." To eliminate the confusion of names, each class and type has been standardized with an identification number. Figure 43 gives the standard class and type numbers and shows the production areas and leading markets.

The type divisions are altogether too broad to be used as the basis for selling and buying. For that reason, standard grades are being established. Each type has from 50 to 100 or more grades.

FIG. 41.—Barn filled with air-cured tobacco. Several types of tobacco are cured by this method, most important of which are Cigar, Burley, and Dark air-cured

FIG. 42.—Tobacco prepared for sale at public auction

Each grade has certain distinctive characteristics which determine its value and suitability for a particular use. The standard grades are designated by a combination of letters and numerals. In all

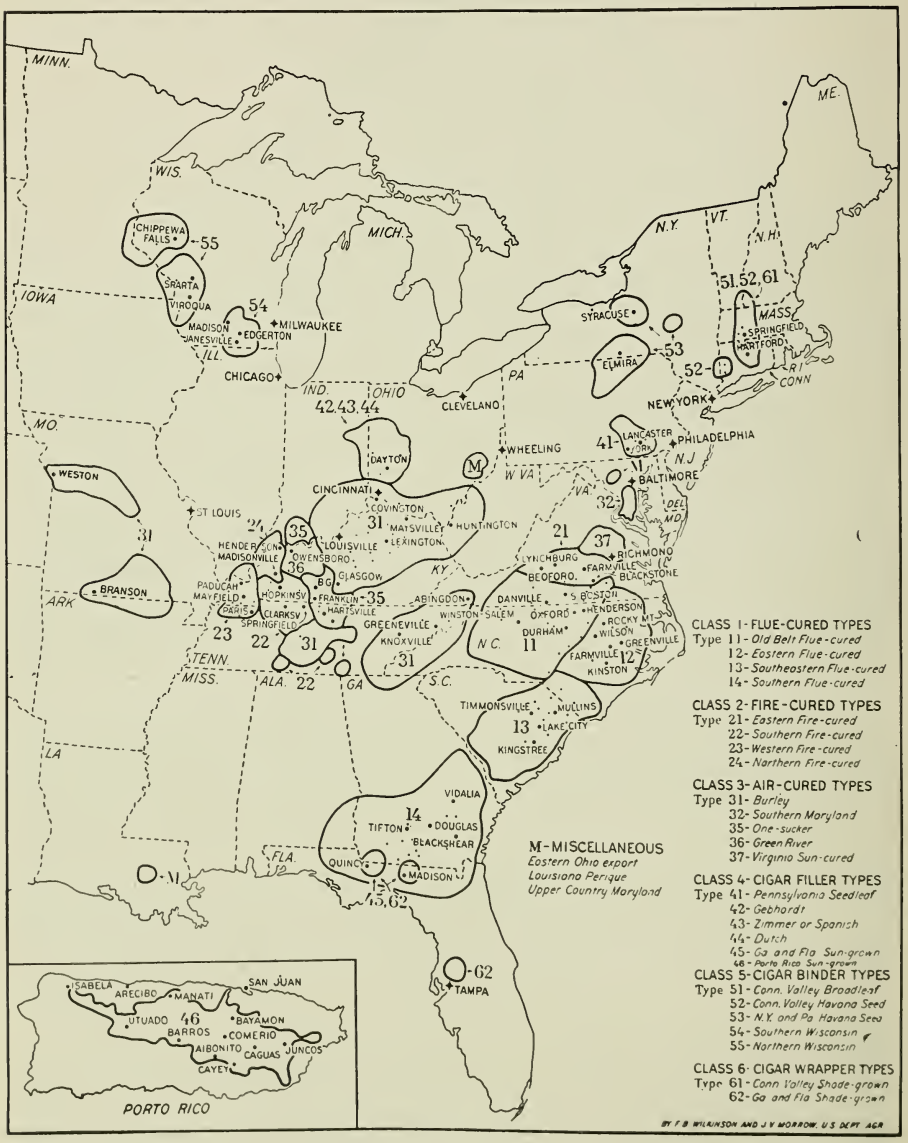


FIG. 43.—Principal tobacco markets, together with standard class and type numbers

types the grade symbols start with one of the following letters: A, B, C, X, Y, or N. These letters represent the different kinds of tobacco found in a single type. For example, "A" designates a

smooth, elastic, and oily tobacco known as "wrappers," which is suitable for the outer covering of a cigar, plug, or twist. Numbers are used after these letters to show the relative quality of the tobacco, as A1, B1, etc., for the best quality, A2, B2, etc., for the second quality, and so on.

Next comes the color of the tobacco, which is designated by appropriate letters, as "D" for dark, "L" for light, and "G" for green. Thus, A1 L represents wrappers of the best quality in light color; A1 D, wrappers of best quality in dark color; and A3 G, wrappers of the third quality in green color. Tobacco sizes suitable for showing the length of tobacco leaves have been standardized and these size numbers are shown after the grade marks in some types.

Foreign Trade.—Tobacco is exported from the United States to practically every country in the world. Large quantities of classes 1, 2, and 3 are exported. Great Britain, China, Australia, Germany, Canada, and Japan are the largest importers of class 1. France, the Netherlands, Spain, Portugal, Belgium, and Germany are the largest importers of classes 2 and 3. In 1927 the American tobacco exports were valued at more than $145,000,000.

Exports from the United States are handled customarily by domestic dealers and manufacturers or by representatives of foreign firms and monopolies which have establishments in this country. The same agency usually supervises the buying, conditioning, packing, and shipping. Carefully prepared export declarations have to be made and many details attended to which require the services of persons familiar with export procedure. In the importation of tobacco into the United States, the customs and internal revenue regulations must be complied with and the import duty paid.

OTHER IMPORTANT CROPS

In addition to the crops—corn, wheat, cotton, and tobacco—mentioned in the preceding pages, the farms of the United States produce about a hundred million tons of hay annually besides large quantities of other field crops, fruits, vegetables, and nuts. Large areas too rough for cultivation supply an abundance of grazing. Of the grain crops besides corn and wheat, the more important are oats, barley, rye, flax, rice, buckwheat, sorghum, and kafir.

The principal fruits grown in the United States are apples, oranges, grapefruit, lemons, cranberries, grapes, peaches, pears,

strawberries, cherries, and plums. Raisins and prunes constitute well-developed branches of the fruit industry.

Among the important nut crops are walnuts, almonds, and pecans. The United States devotes about a million acres to peanuts annually, though this tuber is more properly considered a field crop than a nut.

The production of vegetables is conducted on a liberal scale in almost all States. The potato crop is one of the most important. Others of prominence are asparagus, beans, cabbage, carrots, cauliflower, celery, corn (sweet), cucumbers, eggplant, lettuce, onions, peas, peppers, spinach, sweet potatoes, and tomatoes. Muskmelons and watermelons are raised likewise on a large scale. The fruit and vegetable production in the United States support extensive cannery and preserving industries. The United States produces sugar from both sugar cane and beets, and this production is supplemented by that of its island possessions—Porto Rico, Hawaii, and the Philippine Islands.

The limited size of this report does not permit a detailed discussion of the various crops mentioned. There follow, however, brief descriptions of the manner in which the extensive potato crop and several important fruits are handled commercially.

POTATOES

During recent years the total production of potatoes in the United States has averaged close to 400 million bushels, and in 1928 a record crop of about 464 million bushels was raised. Approximately one-third of the total crop is shipped in car lots to consuming centers, and most of the remainder is used on the farms or in near-by markets, either as food or seed. Cull potatoes are converted into starch and other by-products, or fed to livestock. The business of growing certified seed potatoes is increasing rapidly and accounts for the large yields per acre in many States.

Practically every form of selling is used for the disposal of the potato crop. Considerable quantities are handled by cooperative organizations of farmers; many shipments are made by individual growers; car-lot buyers assemble in the important shipping sections; brokers handle a large volume of sales, and, especially in seasons of low prices, many cars are sold on a percentage basis through city commission merchants.

The United States grades for potatoes are used widely and practically all car-lot sales are made on the basis of such grades. (Fig. 44.)

Recent annual imports of potatoes have averaged about 5 million bushels, which is only about 1 per cent of the United States production. They come chiefly from eastern Canada, which is an important producing district, and occasionally from European countries. Lighter shipments of new stock arrive during the winter and spring from Bermuda and Cuba. Exports of potatoes are very small—only about 2 million bushels—and are mainly to Cuba, Canada, and Mexico. Barrels and sacks are the leading packages for international trade.

FIG. 44.—U. S. No. 1 grade potatoes

APPLES

The total production of apples in the United States usually exceeds 200 million bushels, and the commercial crop, or that which is shipped to market, averages about 90 million bushels or 30 million barrels. Large quantities of apples are used locally on farms. The crop is utilized as fresh fruit, in canned or in dried form, or manufactured into such by-products as apple butter, apple pectin, cider, and vinegar. That portion of the crop which is shipped to city markets is mostly consumed fresh. Vast cold-storage facilities make this fruit available throughout the year.

The number of cooperative growers' organizations which handle apples is much greater than those interested in citrus fruits.

However, a good share of the commercial crops is handled through independent agencies. Most apples originating in the Eastern States and packed in barrels or bushel baskets are sold through brokers, car-lot receivers, and jobbers in the large consuming centers, whereas most of the western apples, packed in boxes, are handled through fruit-auction companies in the leading cities. Sales in small cities are usually made direct to car-lot receivers or their brokers.

Western States, growing apples as a specialty, have devised official grades or packing standards, suited to local conditions. Eastern and Northern States, using mostly barrels and baskets as containers, have been furnished sets of grades by the United States Department of Agriculture, though a few sections still abide by local standards. All these grades are widely used as a basis for inspection of carloads and of lots in storage, at both the shipping and receiving ends.

Such relatively small imports of apples as are received in the United States come almost entirely from Canada. Exports from the United States usually amount to 10 or 12 per cent of the commercial crop.

CITRUS FRUITS

Oranges, grapefruit, lemons, limes, tangerines, and other citrus fruits, to the extent of 110,000 carloads, or 45 million boxes, are shipped annually from important producing sections to cities and towns of the United States. Most of this fruit is consumed fresh in homes, restaurants, and hotels, though an increasing volume is used each year in the manufacture of bottled juice and in fruit drinks served at refreshment stands. Cull oranges, which formerly cost the growers from $1.25 to $2 a ton to dump, are now converted through by-products factories into orange juice, orange oil, and dairy feed. Cull lemons are made into citric acid, citrate of lime, lemon oil, and citrus pectin. A considerable quantity of grapefruit is canned in Florida.

Most of the California fruit is packed (fig. 45) and marketed by a cooperative organization of growers, which maintains agents and branch offices in the important cities. In like manner most of the Florida fruit is handled through a cooperative organization of growers and a group of independent shippers. Although some citrus fruit is shipped directly to wholesale dealers, most sales in large markets are handled through the fruit-auction companies under a system of competitive bidding. Ample cold-storage space

enables perishable products to be held a considerable time for equitable and profitable distribution.

The State Department of Agriculture in California has devised grades for the packing of citrus fruits grown within that State, and the United States Department of Agriculture has authorized grades, applying particularly to Florida citrus. A cooperative inspection service is available at shipping points in both these States, as well as in terminal markets.

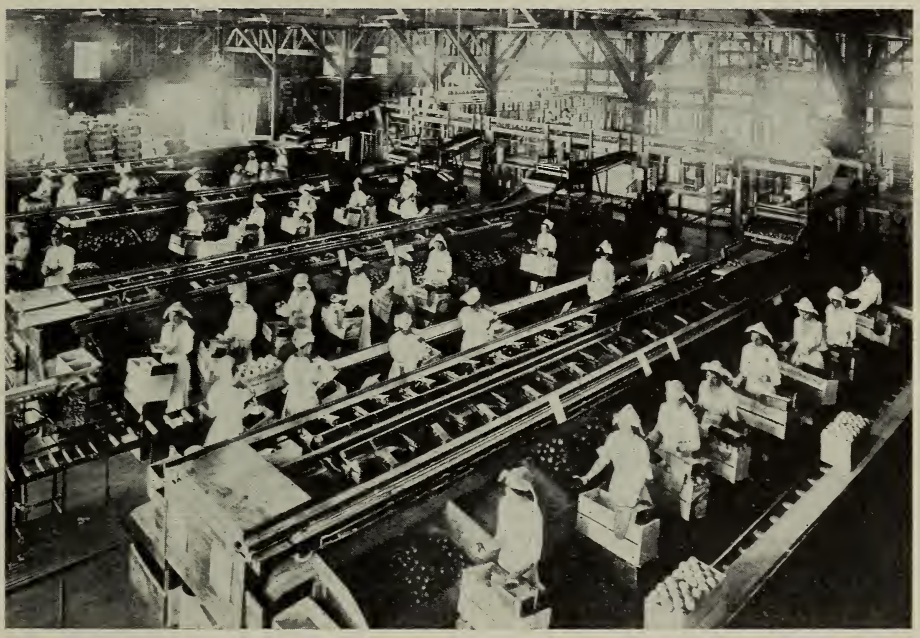


FIG. 45.—Interior of a well-equipped packing house designed for packing oranges

Exports of citrus fruits are mainly to Canada. Possibly 3 million boxes of oranges and one-tenth as many boxes of lemons are exported annually. Shipments of grapefruit to Great Britain and Germany have been rapidly increasing. Imports of lemons are almost wholly from Sicily, averaging slightly under a million boxes each year. Cuba, the Isle of Pines, and Porto Rico furnish most of the 2,500 carloads of grapefruit imported into continental United States annually for consumption.

FARM ANIMALS AND ANIMAL PRODUCTS

SOME conception of the magnitude of the livestock industry in the United States may be gained from the fact that in 1927 the estimated number of cattle, calves, hogs, and sheep slaughtered amounted to nearly 109 million head. The total estimated amount of carcass meat produced from this slaughter was nearly 17 billion pounds. Naturally not all of the huge amount of meat produced in the United States is consumed at home. The exports, during the last few years, of meat, excluding lard, have ranged from more than a billion pounds in 1923 to 352 million pounds in 1927. Imports of meat into the United States have always been relatively small.

BEEF CATTLE

PRODUCTION ON FARMS AND RANGES

Beef production in the United States is of two well-defined types, namely, the production of breeding cattle and the raising and fattening of cattle primarily for meat purposes. The raising

FIG. 46.—Shorthorn breeding herd on a farm in the Corn Belt where the Department of Agriculture is conducting beef-cattle production studies

of cattle for breeding purposes is confined almost exclusively to registered, purebred herds. Those used for producing meat, or commercial beef production, as it is commonly termed in the United States, are commonly high-grade cattle, though many of those herds also are purebred. Both types of production are closely related, one being more or less dependent on the other. Choice sires from the purebred herds are used in the commercial herds. When conditions are favorable for the beef herds maintained for

FIG. 47.—Aberdeen-Angus breeding herd in the eastern part of the Corn Belt

meat purposes, the purebred breeders are benefited, as they are able to dispose of more bulls for use in the commercial herds.

Principal Breeds.—Although purebred herds are kept throughout the country, they are most numerous in the Corn Belt or Middle Western States. The Shorthorn, Hereford, and Aberdeen-Angus breeds are the most highly developed and widely distributed in the United States. Other beef breeds, such as the Red Polled, Galloway, and Devon, are found in considerable numbers only in limited areas, and the Brahman (Zebu) is used to some extent in the coastal region adjacent to the Gulf of Mexico. The Shorthorn (fig. 46) has become particularly popular in areas like the Corn Belt, under farm conditions, where feed supplies are plentiful, and where both meat and milk qualities are desired in the same animal. The Hereford breed predominates in the western range area, largely because of its excellent grazing characteristics. The Aberdeen Angus (fig. 47) is favored by cattle feeders

principally because of its beefy conformation and tendency to make a very desirable carcass.

Areas of Production.—There are three principal beef-production regions—the range area, the Corn Belt, and the Appalachian region. The range area is essentially the western half of the United States; the Corn Belt includes in whole or in part the

Fig. 48.—Typical Corn Belt feed-lot scene

States of the Central West; and the Appalachian region includes the territory covered by the Appalachian mountain system in the eastern and southeastern parts of the United States.

The range area is the home of feeder cattle, that is, beef-cattle herds that are kept primarily for the raising of cattle which are later "finished" or fattened in other places. The Corn Belt is the principal fattening or finishing ground. The range area, as the name indicates, is a grazing ground—grass is its greatest asset. The Corn Belt, with limited grazing areas but especially adapted to the production of grain and hay crops, is the logical place to fatten the feeder cattle (fig. 48) produced in the western range States. Moreover, the Corn Belt is situated in a strategic position, being between the production area and the slaughter and consumption centers. Great numbers of cattle are sent direct from the western ranges to slaughter, yet the bulk of highly finished beef results from the fattening, in the Corn Belt, of feeder cattle which have been raised in the range area. (Fig. 49.) In the Appalachian region, most of the cattle handled are not only produced

in that area, but finished there for market as well. The fattening, however, is done almost exclusively on grass alone.

Early Maturity Demanded.—The high quality of the beef produced in the United States has resulted from the application of breeding and feeding principles, determined largely through experimentation by the United States Department of Agriculture and State agricultural experiment stations. The modern method has been to breed beef cattle for early maturity, and by the use of proper combination of feeds the result has been the production of a maximum quantity of choice beef at an early age. Steers marketed at 2 years of age to-day produce as much dressed beef as 3-year-olds did 25 years ago. Economical production of beef in compact, well-finished, handy-weight carcasses, to furnish cuts demanded by consumers, has come about through the application, by practical beef producers, of the results of scientific experiments.

FIG. 49.—Hereford cattle utilizing range land in the Great Plains region of the Western States

The United States Department of Agriculture is concentrating its beef-cattle investigations at the United States Range Livestock Experiment Station, Miles City, Montana (fig. 50), and the United States Animal Husbandry Farm, Beltsville, Maryland. At these and several other points basic problems in beef production are being studied.

MARKETING CATTLE AND BEEF

Almost from the time of the first colonial settlements, cattle and beef production has constituted one of the leading agricultural pursuits in the United States. Cattle production is so widely distributed that virtually every section of the country contributes to the Nation's beef supply. Probably cattle numbers reached their peak in 1918, when it was estimated that there were 71,229,000 cattle and calves on farms and ranges in the United States. In recent years the corresponding number has been about 60,000,000, of which somewhat more than a third are slaughtered annually. However, the quantity of meat produced depends not only on the number of animals slaughtered but also on their average weights.

The above figures furnish a fair conception of the magnitude of the cattle and beef industries of the United States. It must be apparent that to supply annually more than 20 million head of bovine animals ready for slaughter, enormous breeding and feeding operations are necessary, not to mention the quantities of grain and forage required to maintain such an industry. To provide facilities for transporting, marketing, slaughtering, and dressing that many cattle and calves, and for distributing the meat to the consuming public also involves colossal tasks.

The large central livestock markets are involved in a majority of the methods of marketing cattle and calves, and there are in the United States something over 65 of these centralized livestock markets. Normally between one-half and three-fourths of the

FIG. 50.—Range livestock-production problems are being studied at the United States Range Livestock Experiment Station, Miles City, Montana

cattle marketed in the United States pass through one or more of these markets. (Fig. 51.)

Marketing Agencies.—The following is a brief sketch of the more important marketing agencies which operate on the larger central markets, or public stockyards, as they are popularly known.

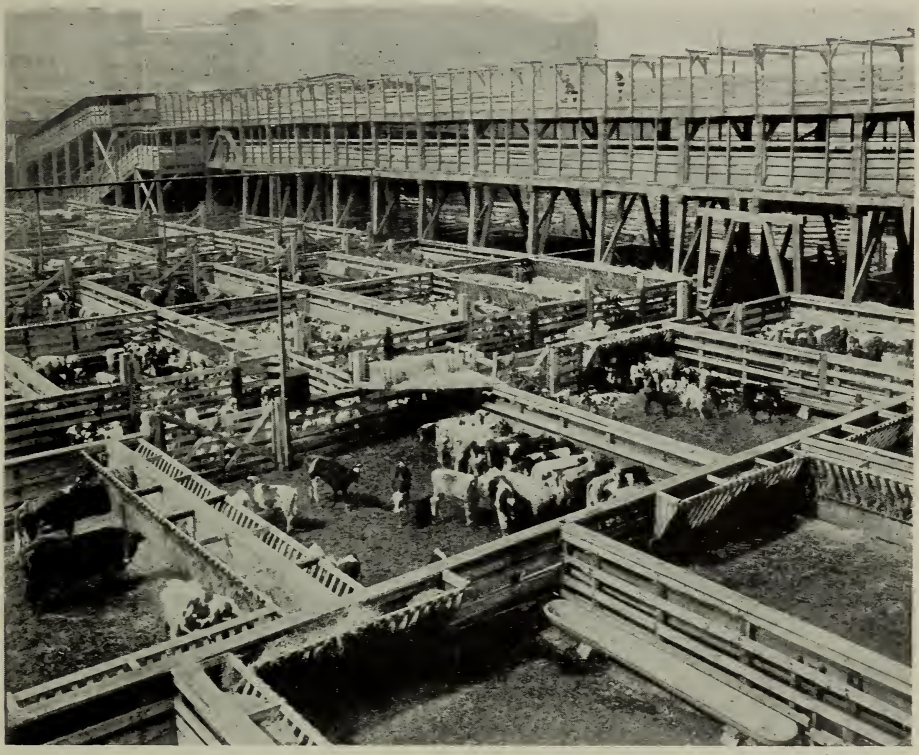


FIG. 51.—View of cattle section of Union Stockyards, Chicago. Note double-deck overhead runways, hayracks, and concrete water troughs

The railroad company provides facilities for transporting livestock (fig. 52) and also for distributing the meat and animal products resulting from the slaughter of the animals.

The stockyard company provides facilities for yarding or housing the livestock; furnishes feed and water for the stock; keeps accurate records of weights, etc., and sees that the animals are put in suitable pens to be displayed to prospective buyers.

The commission man acts as selling agent for the owner of the livestock. Ordinarily he shows the stock to as many prospective buyers as possible and finally sells it to the highest bidder.

The packer buyer is a representative of the slaughtering establishments and usually buys large numbers of animals. He is familiar

with just what animals are available on the market at all times, and selects those that suit the immediate needs of his firm, and buys them at the lowest price possible.

Most public stockyards are located at or near one or more slaughtering establishments. Some of them are enormous plants which slaughter and dress millions of animals annually. They prepare the meat and by-products for sale, not only throughout the United States, but in foreign countries as well. To accomplish this

FIG. 52.—Reloading cattle from railway stock pens en route to market

many of the larger establishments own and operate thousands of refrigerator cars and hundreds of elaborately equipped branch houses and storage plants in all parts of the world.

The larger markets include speculators. These men are on the market daily, and whenever conditions appear favorable they purchase the animals with a view to reselling them at a profit.

The order buyer is an individual or firm which acts as a representative of buyers who are located at greater or less distances from the market. For example a slaughterer in New York City may purchase cattle on the Chicago market by simply telegraphing his requirements to an order buyer operating on the Chicago stockyards.

Federal Services.—The Federal market news service, although not, strictly speaking, a commercial agency, nevertheless performs functions of great importance in connection with the marketing of livestock, meats, and wool. This Government owned and operated news service has headquarters in Washington, D. C., and branch offices in 22 of the leading livestock and meat markets. More than 8,000 miles of leased telegraph wire are utilized to link the offices with one another and with headquarters

FIG. 53.—A Government market reporter gathering information regarding meat

in Washington. The distribution of this market information includes the use of an extensive chain of radio broadcasting stations. At some of the larger markets reports are sent out at approximately 30-minute intervals during the active trading period.

A feature of this Government market news service, in addition to its timeliness, accuracy, and lack of bias, is the fact that it utilizes fixed and uniform grade standards. The same standards are applied by all Government reporters, at all markets, at all times. (Figs. 53 and 54.) Hence the term "Choice grade slaughter steer" denotes the same kind of an animal regardless of what reporter uses the term or what market is being reported.

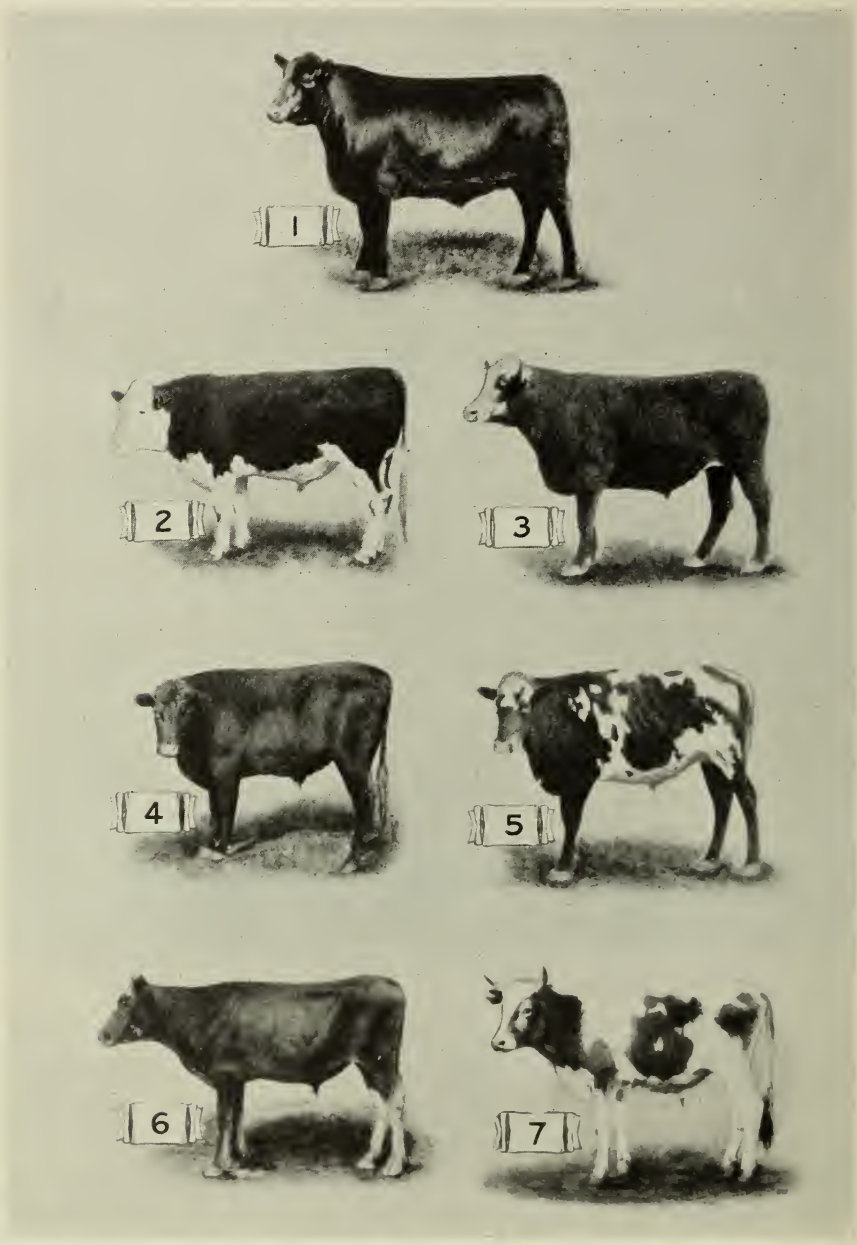


FIG. 54.—United States grades of slaughter steers: 1, prime; 2, choice; 3, good; 4, medium; 5, common; 6, cutter; 7, low cutter

The Federal meat inspection is one of the most important contributions which the Government makes to the livestock and meat industries. The meat-inspection service determines and guarantees

the soundness and wholesomeness of meat intended for interstate and foreign trade. A small, round stamp is applied to each wholesale cut of the carcass so that all may know that the meat has been

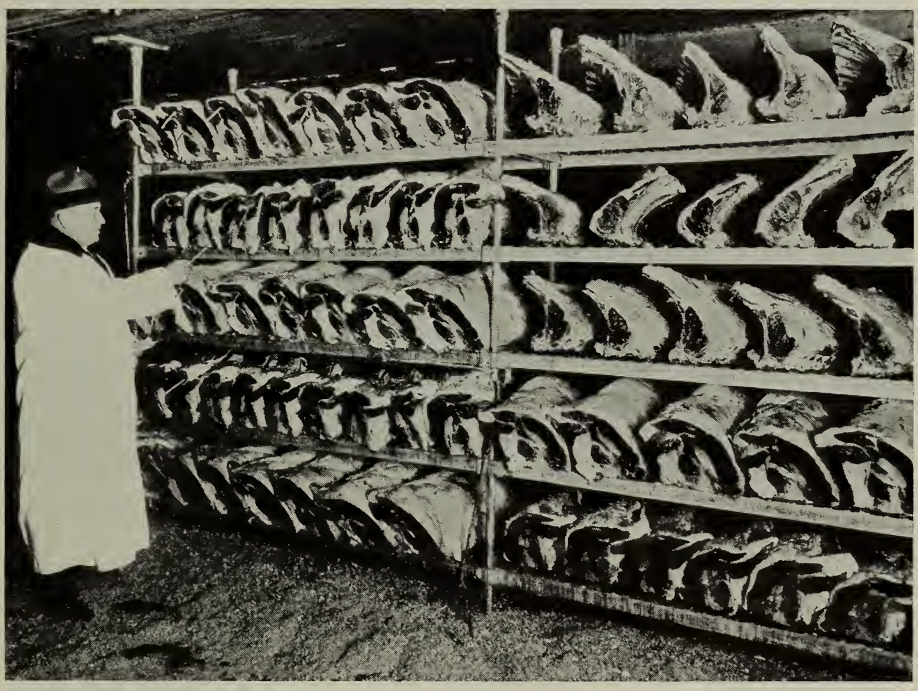


Fig. 55.—Government meat grader grading wholesale cuts of beef in a modern cooler

inspected and passed by a Government representative. The inspection extends also to the sanitary condition of establishments and to curing, canning, and other operations.

The Federal meat-grading service determines and guarantees the degree of excellence of the carcass. These determinations are made on the basis of fixed and uniform grade standards. The grading service covers all carcass meats. (Fig. 55.) In the case of beef it may be stamped "U. S. Prime Steer," "U. S. Choice Heifer," etc. The grading and stamping services are contingent on the inspection service, since only federally inspected meats are either graded or stamped.

DAIRY CATTLE AND DAIRY PRODUCTS

PRODUCTION AND CONSUMPTION

Each year milk and dairy products are becoming a greater part of the diet of the American people. The yearly consumption of

FIG. 56.—Holstein-Friesian cattle on grounds of the United States Soldiers' Home, Washington, D. C

milk in fluid form in 1917 was estimated at 42.4 gallons per capita. In 1926 the estimate was 55.3 gallons per capita. Similarly, most other dairy products are being consumed in larger quantities each

FIG. 57.—Pasture scene in a well-developed dairy district. The cattle are Jerseys

FIG. 58.—A dairy-farm scene, showing Guernsey cattle on pasture

year. Increased knowledge concerning the food value of milk and dairy products is largely responsible for the popularity of these foods.

FIG. 59.—A herd of Ayrshire cattle in a picturesque, pastoral setting

Only about one-fourteenth of the population of the world is in the United States, whereas one-fourth of the world's dairy cows, or about 22 million, are at present in this country. The farm value of the milk and dairy products produced annually in the United States in recent years is, in round numbers, 3 billion dollars.

FIG. 60.—Mechanical milkers aid in reducing labor on dairy farms

Of approximately 33 million dairy cattle in the country, including all young animals and bulls, about 1,200,000 are registered purebreds. These are divided by breeds approximately as follows: Holstein-Friesian, 700,000; Jersey, 300,000; Guernsey, 150,000; Ayrshire, 40,000; Brown Swiss, 8,000; and Dutch Belted, 2,000. Typical herds are shown in Figures 56 to 59.

The principal dairy regions are in the vicinity of the Great Lakes, and include the States of Wisconsin, Minnesota, New York, Iowa, and Illinois. These regions not only are near large centers of population, but also grow an abundance of crops suitable for dairy feed.

Dairy herds of all sizes are to be found in the United States. In the dairy sections close to large cities where the milk is produced for the fluid-milk market, the herds are comparatively large, ranging

from about 15 to several hundred cows. Many of the larger herds are milked by machinery. (Fig. 60.)

In parts of the country where the product is sold to creameries and cheese factories, the herds are much smaller; and as a rule the owner of the farm with his family not only tills the soil but does

FIG. 61.—Interior of a modern dairy barn, illustrating sanitary equipment

all the work in connection with the dairy herd. There is widespread interest in high standards of dairy sanitation as well as in establishing and maintaining herds free from disease. (Fig. 61.)

Factors Influencing Production.—The average yearly production of the cows in the United States has been increasing steadily from 3,700 pounds of milk per cow in 1917 to 4,600 pounds in 1927. This improvement has been brought about through the combined influence of several agencies, such as experiment stations, both Federal and State, agricultural colleges, the agricultural press, and many organizations.

Much of the improvement has resulted from the activities of the breed associations, which have built up a system of official testing of purebred dairy cattle. The bulls from these purebred herds have been used in many grade herds, resulting in an increase in the

average production of a large number of these cows. The dairy-herd-improvement associations in the United States have likewise played an important part in this increase.

These associations are financed and controlled by the owners of the cows, but the State agricultural colleges supervise the testing work. The Federal Government furnishes record books and report blanks for the testing, and in return the associations send to the

FIG. 62.—Unloading platform at a large milk terminal. Thousands of quarts of milk pass over this platform daily, going to various distributors whose trucks transport it quickly to the city plant, where final preparation for city delivery is made. The milk platform is cleared daily, for milk freight can not be held over

United States Department of Agriculture complete reports of the testing for summarizing and investigation. The increasing public demand for milk and dairy products is being met by a greater production per cow rather than by more cows.

MARKETING DAIRY PRODUCTS

The course of dairy products from the farm where the original milk is produced to the consumer is highly complex. In general the functions to be performed are assembling, processing, transporting, storing, and distributing. (Figs. 62 and 63.)

The producer sells his milk or cream to a creamery, condensery, cheese factory, milk plant, or local buying station. At these places the processing is done, churning and packaging of butter, condensing and packaging of milk, the making of cheese, and the

pasteurizing, cooling, and bottling of market milk. The product is then ready to be sent into the various distribution channels.

City Milk Supplies.—If the product of the dairy farm is destined for the market-milk trade, it is collected by haulers or taken by the producer to the milk plant or a branch receiving station. At the milk plant it is pasteurized, cooled, and bottled. Practically all the larger cities and towns have rigid regulations

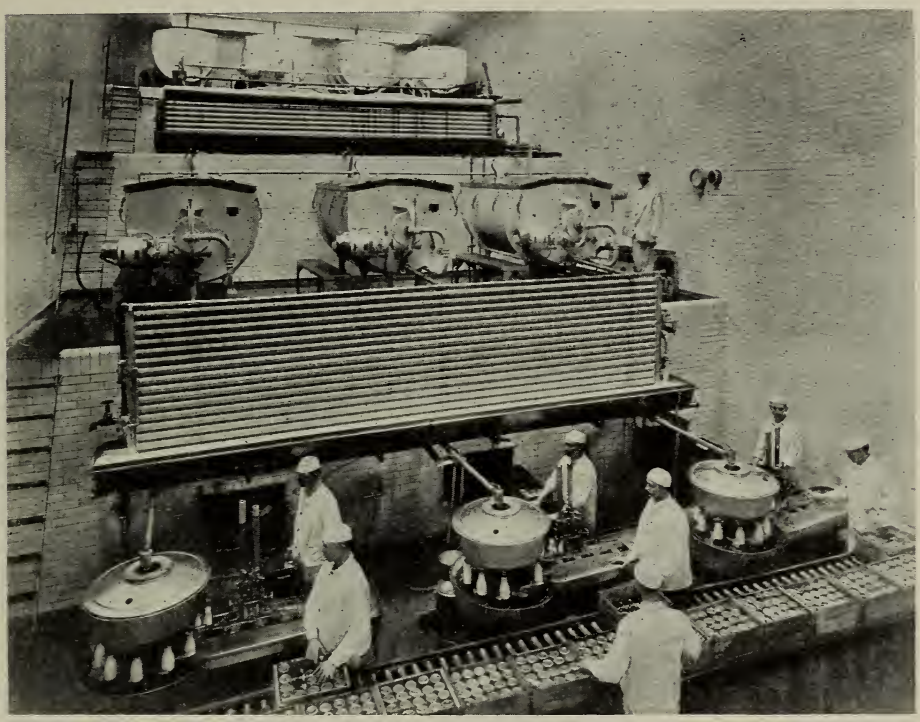


FIG. 63.—Interior of a modern milk plant showing 4 milk-storage vats, preheater, 3 pasteurizing and holding vats, cooler, 3 automatic bottle filling and capping machines, and conveyer for bottle cases

requiring pasteurization of all milk sold, except certain special grades. There are also regulations dealing with the composition of the milk and the sanitary conditions under which milk production is conducted. Milk that meets particularly rigid tests may be sold raw, that is, unpasteurized. These grades are given special names, such as "Grade A, Raw," and "Certified," and they usually command a premium. In recent years there has been marked development in the long-distance shipping of milk and cream to cities. For this purpose the

use of refrigerated or insulated tank cars and tank motor trucks is steadily increasing.

Manufactured Dairy Products.—More than 2 billion pounds of butter a year are now produced, and much of it is packed as pound prints wrapped in parchment paper and cartoned. (Fig. 64.) The common wholesale package for butter in the Middle West and East is the spruce tub holding about 64 pounds net weight. On the Pacific slope the more usual package is the 68-pound box. Jobbers frequently perform the service of cutting the

FIG. 64.—Butter-print room in a large distributing organization. There is a rapidly growing tendency in the United States for dairy products to be packed in consumer packages. This picture shows the process of printing, wrapping, and cartoning butter

wholesale packages into 1-pound or quarter-pound prints before selling to the retailer.

Cheese factories are usually small units and have limited facilities or no facilities for holding the product after manufacture. For this reason most of the sections which produce American, or Cheddar, cheese have developed a system of cheese warehousing. At these warehouses, scattered throughout the producing areas, the cheese is received from the factory, paraffined, and held until aged sufficiently to make it acceptable on the markets. In some limited areas considerable quantities of foreign types of cheese are

made, and in these types the usual practice is to send the product direct to the dealer.

About 4 per cent of the total milk production is condensed or evaporated. The condenseries are also scattered throughout the producing sections. Many individual plants are rather small, although operated as a part of a large central organization. The milk received from the producer is processed and packed at the plant and is then usually shipped to some central distribution point. The two chief products of the industry—sweetened condensed and unsweetened evaporated—are packed in tins in cases and in barrels. The tinned, or case goods, are used by the direct consumers and for export purposes. The bulk goods are used by manufacturers, such as bakers, confectioners, and ice-cream manufacturers.

The dairy by-product industries, such as the drying of milk, the production of casein and milk sugar, are usually carried on in connection with some other main dairy enterprise. These industries, especially the dry-milk industry, have developed rapidly in the last few years, as new uses for the products have been found. Dry milks have gained a wide use in bakeries, by confectioners, and prepared-flour manufacturers, and as ingredients for poultry and stock feeds.

A very noticeable tendency in the United States is the growing use of consumer packages in the dairy-products trades. Most of the fluid milk is sold in bottles instead of in bulk; much of the butter, as already mentioned, is sold in 1-pound or quarter-pound prints; condensed and evaporated milks are always sold to the consumer in cans of various sizes; and there has been remarkable growth in the selling of cheese in package form. In ice cream also there has been constant growth in the use of consumer packages packed at the factory.

Foreign Trade.—In spite of its immense milk production, estimated in 1927 at more than 100 billion pounds, the United States is not quite self-sufficient in dairy products. In recent years there has been an annual import balance equivalent to about 1 billion pounds of fluid milk. To a large extent this import balance is due to imports of cheese of foreign types which this country has not yet produced in successful competition with other countries, especially Switzerland, France, and Italy. There is normally a small import balance of butter and dry milk, which is offset by the usual exportation of condensed and evaporated goods.

SHEEP AND WOOL

PRODUCTION ON FARMS AND RANGES

The two major types of sheep raising in the United States are commonly referred to as farm sheep raising and range sheep production. The raising of sheep and wool under farm conditions prevails largely in the eastern half of the country, though farm flocks are also kept in some of the irrigated valleys of the West. In farm sheep raising the flocks are small or of moderate size and usually are kept in connection with general livestock farming. Range sheep production prevails in the Western States, and involves the maintenance of large bands of from 1,000 to 2,000 sheep. (Fig. 65.) Some sheep-ranching companies keep from 10 to 20 such bands and a few of the largest as many as 40 or 50 bands. Considerably more than one-half of the sheep of the whole country are in the western range States, where the enterprise is highly specialized.

FIG. 65.—A band of range ewes of the Lincoln-Rambouillet type on grazing lands in Idaho. The camp wagon is the sheep herder's home

The United States census of 1920 enumerated the purebred sheep of the country, showing that 54.1 per cent were of the medium-wool type, 42.2 per cent were fine wools, and 3.7 per cent

were long wools. The principal breeds are the Shropshire, Rambouillet, Merino, Hampshire, Oxford, Lincoln, Dorset, Southdown, Cheviot, Leicester, and Suffolk. In the farming States the

FIG. 66.—Western breeding ewes of the Lincoln-Rambouillet crossbred type on a Corn Belt farm

Shropshires predominate, and in the western range country Rambouillets are most numerous. In those parts of the western range country where an abundance of winter sheep feed is produced in irrigated valleys and the sheep are grazed on lush forage of the high mountains in the summer, many Lincoln-Rambouillet crossbred ewes are bred to Hampshire rams for the production of rapid-growing, plump lambs that are usually finished for the market on the high, mountain pastures without extra fattening on grain.

Methods of Feeding and Management.—The production of sheep is largely influenced by such factors as type or breed, feed including grazing, water supply, climate, parasites and diseases, predatory animals, poisonous plants, and various methods of management in flocks or bands. These factors constitute the major problems of sheep producers.

It is customary for American sheepmen to graze their sheep on pastures as much as possible throughout the year, thereby keeping the cost of feed at a minimum. In seasons when the forage of the pastures or ranges is not sufficient to provide ample feed, good sheep managers feed supplements such as corn, oats, bran, cottonseed meal, or linseed meal. Roughages, such as clover or alfalfa hay, are also fed when the forage of the pastures or ranges is not available,

FIG. 67.—Sheep feeding in Colorado

especially during the winter. Some sheep producers furnish their breeding ewes with extra good grazing or concentrate supplements just before and during the breeding season. This practice has been investigated by the United States Department of Agriculture with ewes of the Southdown, Shropshire, and Hampshire breeds. It was found that, on an average, approximately 16 more lambs per hundred ewes were born to the ewes that were "flushed" with extra feed at breeding time. It is also quite a common practice among good shepherds to feed a little extra grain and choice pasture (fig. 66) or legume hay to ewes just before and during the lambing season to insure plenty of milk for the lambs. The fattening of feeder lambs is a specialized enterprise in parts of Colorado, Nebraska, Iowa, Missouri, Illinois, Indiana, Ohio, and Michigan. (Fig. 67.)

An abundant supply of water is usually available for sheep in the farm States and in the valleys of the western range country. On the summer grazing lands of the high mountains sheep find plenty of excellent water, but there are vast areas of western range lands that are far away from running streams or other sources of water, and these are grazed only when the snows of winter or the rains of spring and fall provide a means for sheep to quench their thirst.

RESEARCH WORK AIDS THE INDUSTRY

Important problems of the sheep industry are being investigated by the United States Department of Agriculture (fig. 68) and State

agricultural experiment stations. Research methods are used in the conduct of these investigations. They deal with such problems as the utilization and improvement of ranges and pastures for sheep; the feeding of sheep and lambs; the development and improvement of types and breeds of sheep (fig. 69) for adaptation to specific regions; and studies of the factors that influence the production and quality of the wool and meat of sheep (fig. 70). The object of this research work is to eliminate wasteful methods and improve the quality of the products.

MARKETING AND CONSUMPTION

Sheep and Lambs.—Up to the middle of the last century sheep were raised primarily for wool, an insignificant quantity of mutton being consumed in the United States. As population increased and the cost of living was raised the demand for mutton increased. Thereafter, the sheepmen had two sources of income, namely wool and mutton. An effort was then made to expand the market for the meat by slaughtering animals as lambs, thereby producing a more attractive carcass and more palatable meat. This change met with success and the industry is now on what may be called a lamb and wool basis, with lambs furnishing approximately two-thirds of the sheepman's income. (Fig. 71.) Most of

FIG. 68.—A portion of the United States Department of Agriculture's Southdown flock, at Middlebury, Vt.

the lambs marketed in the United States are under 1 year old. Because these animals are so young it is difficult to ship them long distances without incurring serious loss in weight and a material lowering of quality and appearance. Similar difficulties arise in connection with shipping dressed carcasses because the character of the flesh is such that it does not keep well for long periods under mild storage temperatures.

FIG. 69.—Rambouillet rams of the United States Sheep Experiment Station, Dubois, Idaho. At the right is the famous ram, Prince of Parowan, at 8 years old; all the others are his sons at about a year old. Prince of Parowan weighed about 275 pounds and his first seven annual fleece weights averaged 31.5 pounds. Note the large size of his yearling sons

These facts have been responsible for the establishment of feeding stations along the main railroad routes from producing areas to the central markets. Some of these feeding stations have extensive equipment for holding large numbers of sheep and lambs a considerable length of time and providing feed, water, and opportunity for exercise. The chief purpose of these yards is to restore to the animals some or all of the weight lost during shipment and put them in good market condition. The marketing agencies involved are practically the same as those used for cattle, already discussed.

The number of sheep and lambs slaughtered in the United States in 1927 was about 16½ million head, which produced about 645 million pounds of dressed meat. Practically all the lamb and mutton produced in the United States is consumed within its borders. Imports of dressed lamb and mutton have occasionally

assumed some importance but are normally small, amounting in 1927 to but 3 million pounds.

As already indicated, wool furnishes about one-third of the income of sheep producers in the United States. The marketing of wool involves an entirely different set of problems from those involved in marketing sheep and lambs. Being a nonperishable commodity, wool lends itself to indefinite storage. Also, wool is a world commodity, the price of which is determined in world rather than domestic markets. Although the United States has an average annual wool production of about 300 million pounds, it has never produced enough to meet its needs. Imports of wool average nearly 300 million pounds a year, about the same as domestic production.

Wool marketing in the United States is more concentrated than is true of almost any other important commodity. Boston, which is

FIG. 70.—Shearing sheep at the United States Sheep Experiment Station, Dubois, Idaho. The small cans on the floor are used for samples of experimental fleeces

the second largest wool market in the world, is by far the leading market in the United States. In some years Boston handles 75 per cent of the domestic wool and as high as 70 per cent of the imported product. Philadelphia, New York, and Chicago are also important markets.

Several methods of marketing are utilized by growers in various sections of the country, the method adopted usually depending partly on the location of the producer and partly on the volume in which the wool is produced. In the farming areas the local wool buyer still provides a market for many growers, although local wool pools, which are a cooperative enterprise of comparatively recent development, handle considerable quantities. In the western areas where sheep are kept in large bands and a single operator frequently has several thousand fleeces to market, the grower often sells his wool direct to the manufacturer.

FIG. 71.—Government livestock market reporter (at left) observing a lamb sale

The more important methods of marketing wool are as follows: (1) Through local wool dealers; (2) direct to local mills; (3) direct to central market dealers; (4) by consignment to commission merchants; (5) through local wool pools; (6) through State cooperative woolgrowers' associations; and (7) direct to manufacturers.

Each of these major methods of marketing appears in a variety of forms and each possesses advantages and disadvantages.

Wool prices in the United States are determined largely by prices prevailing in world markets. In view of this and the further fact that world wool production varies widely from year to year, wool prices have always been subject to wide fluctuations and as a result the woolgrower has alternately experienced periods of abounding prosperity and serious depression.

In an effort to assist the industry in general, and the wool producer in particular by furnishing prompt and accurate economic information regarding the industry, the United States Department of Agriculture maintains a wool-market reporting service. This wool-market news service follows rather closely the conventional lines of the livestock and meat market news services and utilizes many of the same facilities. The department has also worked out official grade standards for wool which have been correlated with the British count system and give promise of being suitable for universal adoption throughout the world.

SWINE, PORK, AND LARD

PRODUCTION

The estimated value of hogs on farms of the United States in recent years has exceeded $700,000,000. The general principles that apply to hog production are much the same in all parts of the country. Local advantages, however, which favor abundant and cheap production of feeds, are responsible for greater numbers of hogs in some areas than in others. Economy of production of hogs is obtained largely through quality or purity of breeding and by feeding well-balanced rations.

Market demand fixes to a considerable extent the desired type and weight, but these qualities are rather uniform in the various breeds of hogs. The breeds which are especially adapted to quick maturity and fattening qualities are the Duroc-Jersey, Poland China, Chester White, Spotted Poland China, Hampshire, and Berkshire. These breeds far outnumber the Tamworth and Yorkshire, which are regarded as pronounced bacon breeds.

Hogs possess from birth remarkable powers of digesting and assimilating feed, and they maintain this ability throughout development to maturity. It is this power of utilizing feed to advantage that has made the hog so efficient in transforming coarse feeds, such as forage crops and cereal grains, into meat for consumption as human food.

Greatest success in feeding hogs results from a proper ratio between the protein and carbohydrate elements in the ration, together with ample mineral supplements. Milk is naturally adapted to the requirements of newborn pigs. After reaching the age of 3 or 4 weeks young pigs seek supplemental feeds and will eat grains and graze pastures to a limited extent.

FIG. 72.—Feeder pigs on alfalfa pasture

Hogs Select Their Own Feed.—The use of "self-feeders" permits hogs to select their feed from any of the compartments of the feeder, and to consume as much of each variety as their appetites crave. This method of feeding is known as the free-choice, self-feeder system. Practical experience and experimental tests have demonstrated this system to be economical in the production of hogs for market.

FIG. 73.—Experimental lots and equipment used in swine investigations

The commercial hog industry of the country is built on the return of a reasonable profit to the producer. Obviously most of the hog feed must be produced on or near farms where the hogs are fed. On well-managed hog farms concentrated supplementary feeds only should be purchased. The utilization of grazing crops to the greatest amount, consistent with gains in weight, likewise results in economy of production. (Fig. 72.)

Experimental research (fig. 73) in genetics, nutrition, and sources of cheaper feed and feed supplements are constantly adding to the economy and efficiency of pork production. The present market demand in the United States is for hogs of lighter weights with high dressing percentages.

FIG. 74.—Unloading hogs at a public stockyard

MARKETING

Because of the efficiency of swine in converting farm products and by-products into edible meat and fats, these animals early took high rank in the agriculture of the United States. In number of head marketed and slaughtered, swine far exceed all other kinds of livestock. In 1927 the number of swine slaughtered amounted to 69,250,000 head. Swine production and slaughter, however, vary rather widely because of changing crop and economic conditions. Not only are swine particularly efficient in converting crops into

meat and fat, but they produce a higher proportion of edible product in the carcass than any other domestic animal.

Naturally the enormous quantity of pork and lard produced in the United States is not all consumed domestically. Exports of these products have normally amounted to about 12 per cent of the total production.

The swine producer in the United States utilizes all the methods of marketing to which reference was made in the discussion of cattle and beef.

Swine growers, however, have utilized the cooperative method of marketing more than other classes of livestock producers.

No outline of swine and pork marketing in the United States would be complete without reference to the importance of storage. During the season when market supplies of hogs are light a larger proportion of the pork resulting from slaughter is sold as fresh pork than during the season of heavy marketing of swine. Nevertheless, at all times, huge quantities of pork and pork products are cured and held in storage for varying periods of time.

Some conception of this feature may be gained from the fact that on April 1, 1928, there were 1,162 million pounds of pork and lard in storage in the United States, but six months later the quantities of these products in storage had dropped to 642 million pounds.

Per capita consumption of pork and pork products in the United States has always been fairly high. The consumption of pork in recent years has ranged between 65 and 70 pounds. Per capita lard consumption is normally about 14 pounds.

HORSES AND MULES

In addition to cattle, sheep, and swine there is also an extensive horse and mule industry which is worthy of mention. In recent years horses on farms have numbered about 15 million. The United States also contains slightly more than 5 million mules. The principal use of horses and mules (fig. 75) is for farm and ranch work, although large numbers are also used in cities and for logging, mining, and other industrial purposes. Large numbers of horses and mules are likewise needed for the Army. Mules, particularly, are exported in considerable numbers to many foreign countries. Marked demand is chiefly for the heavier types of horses, yet light horses also are raised in considerable numbers for recreational uses, for racing, polo, and other sports.

FIG. 75.—A pair of choice draft mules. American mules are favorably known throughout the world

POULTRY AND EGGS

PRODUCTION

Poultry is raised on about 90 per cent of all the farms in the country and the industry extends to every State. About 85 per cent of the fowls are produced on general farms where flocks of from 20 to 200 hens are kept as a side enterprise. Most of this production comes from the grain-producing States of the Middle West.

Commercial poultry farming, involving large flocks, is carried on to some extent throughout the country, but has been most extensively developed in the Northwestern States and on the Pacific coast. (Fig. 76.) There are a number of poultry farms on which from 10,000 to 20,000 head of laying and breeding fowls are kept.

The annual value of poultry and eggs produced yearly in the United States exceeds 1 billion dollars. The census of 1925 indicates that about 2 billion dozen eggs are produced and one-half billion chickens raised annually in this country. The number of chickens is increasing steadily, but turkeys, ducks, and geese are barely maintaining their former numbers. Ducks and geese each constitute less than 1 per cent of the total number of poultry. A few more turkeys are kept than either ducks or geese.

FIG. 76.—A highly specialized poultry-farm section in California. From 700 to 2,000 hens are kept on practically every farm shown in this picture

Production has tended to increase with the growing population of the country and with the improvement in the marketing of poultry products. Yearly changes in production are influenced by the supply and the demand, which in turn are affected by prices paid for feed and those received for eggs and poultry. (Fig. 77.)

Commercial poultry interests have developed to very large proportions and tend to stimulate production. Hatcheries, some of which produce as many as a million chicks, turn out a total of over one-half billion chicks yearly. A very large trade has been

FIG. 77.—One of many large duck farms in the United States where ducks are raised for market

FIG. 78.—View of houses used in one of the egg-laying contests supervised by a State agricultural college

built up in commercial, ready-mixed poultry feeds of all kinds, which are marketed in all sections of the country. Poultry and egg packing stations are distributed throughout the large poultry-producing States of the Middle West; hundreds of thousands of chickens are fattened each year and many carloads of eggs are graded and packed.

Breeds of Poultry.—A very large number of breeds and varieties of poultry, including turkeys, ducks, and geese, are kept in the United States. Among the most popular breeds of chickens are the Plymouth Rock, Rhode Island Red, White Leghorn,

FIG. 79.—Eggs are candled and graded ready for shipment to market at centrally located egg-packing plants

FIG. 80.—The commercial wholesale egg package is the 30-dozen case. Careful packing in these cases reduces breakage in transit to a very small amount

Wyandotte, Ancona, Orpington, Minorca, and Jersey Black Giant. The White Leghorn leads in popularity on commercial egg farms, whereas the heavier breeds are kept more extensively on general farms. The Bronze is the most popular breed of turkeys, although some of the other varieties are increasing rapidly in numbers. The Pekin is the most popular breed of ducks, and the Toulouse and Embden are the most popular geese.

RESEARCH AND EDUCATIONAL WORK

A large amount of research, educational, and extension work is carried on in poultry husbandry by the Federal Government and by each of the 48 States. Each State has at least one experiment station carrying on research work in poultry investigations.

All the States give instruction in poultry husbandry at their State agricultural colleges and many States give some poultry work in their secondary schools. More than 30 egg-laying contests are now in progress, practically all of which are either conducted by or are under the supervision of the State colleges of agriculture. (Fig. 78.) Each State has at least one worker who devotes his entire time to extension activities. During 1927, about 100,000 young people, nearly half of whom were girls, enrolled in the poultry clubs under the extension service.

Marketing.—The movement of eggs and poultry from the farms of producers to the tables of consumers is a complex procedure because of the long distance between the points of production and consumption in many cases, and also because of the numerous hands through which the products pass.

Considerable quantities of eggs are sold by producers direct to consumers living in the same locality. Some eggs are also shipped by parcel post direct to consumers. By far the greater volume, however, is sold by the farmer to the local storekeeper or to the egg buyer. From these smaller concentration points the eggs are moved by train or by truck to larger concentration points, which are the poultry and egg packing plants scattered at advantageous points throughout the producing territory. There the eggs are graded for size and condition of shell by their exterior appearance and for interior quality by candling. (Fig. 79.) They are packed for shipment in commercial egg cases, each holding 30 dozen eggs. (Fig. 80.)

From the country packing plant the eggs are shipped to market in refrigerator cars each holding about 400 cases. On arrival at the market the eggs may be sold in smaller lots to jobbers, who often handle butter also and who again candle and grade the eggs and sell them to retailers or to large users of eggs, such as hotels and

FIG. 81.—Live poultry is often fattened in feeding stations which form a part of poultry-packing plants. The birds are placed in rows of coops where they may be quickly and conveniently fed

restaurants. The eggs are frequently packed, for sale to consumers, in pasteboard cartons each holding 1 dozen.

During the spring and early summer months, when egg production is at its peak, the supply available is greater than the demand. During this period, therefore, a part of the surplus supply of eggs is placed in cold storage, where it is held until fall and early winter, when the supply of fresh eggs is inadequate to supply the demand. About 12 to 15 per cent of the total egg crop is thus stored each year, and the peak of holdings, which occurs about August 1, amounts to more than 10 million cases.

FIG. 82.—Especially constructed cars used for shipping live poultry to market. The attendant occupies a small room at the center of the car, where feed and water are also carried

Frozen Eggs.—In recent years the preparation of frozen eggs has developed into an important branch of the egg industry. Cracked and dirty eggs and eggs which otherwise are too weak to be shipped to market successfully are often broken out of the shell at country concentration points and frozen. Current-receipt eggs are also used for this purpose when the price is favorable. The breaking is done with special equipment and with careful attention to sanitation. The product prepared may consist of whole mixed eggs, egg white, or egg yolk. The broken eggs are packed in

cases holding 30 pounds each and are immediately hard frozen, in which condition they can be kept for a long time without deterioration, until needed. The frozen-egg products are used by bakers, confectioners, and makers of mayonnaise.

MARKETING POULTRY

Although some dressed poultry is shipped to market by producers, most of it is sold alive. When shipped direct to a consuming market, the birds are sent by express in coops holding from 50 to 200 pounds. In most places, however, they are taken to town by the farmer and sold to buyers who send them to near-by poultry and egg-packing plants. Most of these establishments operate feeding stations holding up to 50,000 head, where the birds are fattened for one to two weeks. (Fig. 81.) After slaughter they are graded for size and quality and packed in boxes holding 1 dozen birds each. Shipment to market is made in refrigerator cars. On arrival at the market the poultry passes through the hands of jobbers and retailers to the consumer or may be placed in cold storage for later sale.

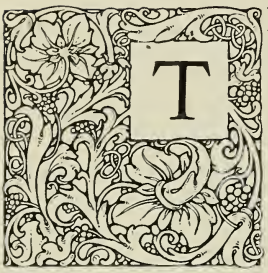
As with eggs, the storage of poultry takes place during the fall and early in winter, and the cold-storage stocks are sold during the later winter, spring, and summer. The poultry for storage is frozen solid and held in that condition. During the entire process of marketing until the poultry goes to the consumer it is handled and shipped in an undrawn condition, that is, with the entrails in the carcass.

A considerable part of the poultry is shipped alive in car lots to the terminal markets. This poultry is demanded especially by the Jewish people whose religion requires that their poultry be freshly slaughtered in accordance with certain rites. Special cars, holding about 17,000 pounds each, are used for such shipments. The cars are so arranged that an attendant may accompany the poultry to feed and water it en route. (Fig. 82.)

Foreign Trade.—Most of the poultry and eggs produced in the United States are consumed within the country. Some shell eggs are exported, principally to Canada, Cuba, Mexico, and South American countries, and some poultry is exported to Europe, but the quantities involved are small compared with the total crop. Imports of shell eggs are very small, but considerable quantities of frozen and dried eggs are imported, principally from China. The most important imports of poultry consist of turkeys from the Argentine.

ROADS AND TRANSPORTATION

MILEAGE OF ROADS AND WATERWAYS



HERE are more than three million miles of public rural roads in the United States. Joining every city and village, reaching the most remote hamlet and farmstead, this vast network, with the connecting streets of the cities, touches the daily lives of all the people more intimately than other transportation facilities. The railroads, of which there are 250,000 miles, provide the means of long-distance travel and transportation. The inland waterways, of which there are nearly 25,000 miles, offer a dependable service where time is not a primary consideration, particularly for the movement of those raw products, of the forests, farms, and mines, which are normally shipped in large volume. Lastly, where high speed is the first requirement, the recently created air services most effectively serve the need. Already these services operate regularly and dependably over more than 11,000 miles of airways.

But, almost invariably, the beginning and end of every journey and of every commodity movement is on the highways; and the ever-increasing utility of the motor vehicle tends constantly to increase the length and number of through movements by road from origin to destination.

INCREASE OF MOTOR VEHICLES

The number of private automobiles in use now exceeds 20,000,000, or one for every six inhabitants. These passenger vehicles are used for both business and pleasure. Hundred-mile trips are common; transcontinental journeys for recreation and sightseeing are made without inconvenience; and the average travel is not less than 6,000 miles a year.

Motor trucks, to the number of nearly three million and ranging in carrying capacity from less than 1 ton to upwards of 7 tons, have almost displaced horse-drawn vehicles for the transportation of goods and commodities. The smaller sizes, used by farmers in large number, are found on all roads; and on the main, intercity

roads the truck traffic, including numerous vehicles of the larger sizes, has increased, in some cases, to such an extent as to suggest the need of special roads reserved for trucks only.

Motor trucks now transport from the farm to the city nearly the entire milk supply of many of the larger cities. (Fig. 83.) Except for the transportation of household goods and a few other special commodities, it is found that the maximum economic length of truck haul is about 50 miles. Within that distance there is a tendency to transfer from the railroads to the highways the movement of all commodities except those which are normally shipped in large bulk.

FIG. 83.—Modern, glass-lined trucks now deliver to American cities a large part of their daily milk supply

RAILROADS AND PASSENGER BUSSES

In recent years passenger busses have been placed in service on regular routes as common carriers. The service offered by these vehicles has steadily improved in comfort, regularity, and dependability, and it is now possible to travel by bus between large cities thousands of miles apart. (Fig. 84.) For the shorter, intercity passenger movements the bus has already become a formidable competitor of the railroads.

As late as 1904 it was estimated that the cost of transporting a bushel of wheat 9 miles from a farm in the State of Kansas

FIG. 84.—De luxe motor busses ply regularly over fine, smooth roads

to the railroad depot was greater than the subsequent cost of transportation by rail and sea to Europe.

Although the railroads were at that time highly developed and efficiently operated, their best services were not sufficient to improve the social opportunities of the American farmer, isolated throughout the long winter by impassable roads.

The neglected roads, therefore, were not only a serious economic handicap; their ill effects on the social structure were of even greater seriousness in that they tended to maintain distinctions between the urban and the rural populaces, and to foster sectional prejudices by isolating one group from another.

In both its economic and social aspects a remarkable change has occurred in the country since the introduction of the automobile and the improvement of the roads. Other factors have contributed to this change, but there is no doubt that the improvement in the facilities of travel by highway has played a major part.

Of the Nation's total of three million miles of public rural highways there have now been improved to some degree, mainly within the last quarter century, nearly 1,200,000 miles. Nearly one-half of this improved mileage is paved with material adequate

FIG. 85.—An improved highway at a high elevation in the Rocky Mountains

FIG. 86.—To reduce costs and speed the construction of the roads inventive genius has supplied machines for every road-building purpose

for the support of the traffic of the present and immediate future; the remainder is properly graded and drained as the first stage of the improvement ultimately to be completed. Of the surfaced roads nearly 90,000 miles have been improved with the most durable materials, such as concrete, brick, and asphalt. The roads thus surfaced are, naturally, the most heavily traveled in the country.

Large sums have been spent by the Federal Government and by the State and local governments to bring about the existing condition of highway improvement. Since 1921 the total annual expenditure by all Government agencies has exceeded a billion dollars.

FEDERAL AND OTHER EXPENDITURES

Of this large sum, the larger part, about $600,000,000, is raised by the governments of the 48 States. The Federal Government appropriates $75,000,000 a year; and the county and other local governments raise and expend nearly $500,000,000 annually.

The Federal appropriation is expendable only for the improvement of roads included in a designated system, known as the Federal-aid system, and embracing about 187,000 miles. The

FIG. 87.—Building a modern concrete highway with up-to-date machinery

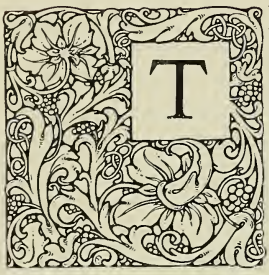
construction of this system is carried on under the joint supervision of the Federal Bureau of Public Roads, a branch of the Department of Agriculture, and the several State highway departments. The roads thus improved are the most important to the Nation at large, consisting essentially of the principal interstate and transcontinental routes. (Figs. 85, 86, 87.)

The independent expenditures of the State governments, under the supervision of the State highway departments, are applied in each State to the improvement of definite systems of State highways which include the Federal-aid roads and other roads which are of primary importance to the State. The county and local expenditures are devoted to the improvement of roads of local importance under the supervision of local officials.

The more important roads of the country are being improved at the rate of more than 50,000 miles a year. In accordance with the policy generally prevailing, the roads are selected for improvement in the order of their traffic importance; the degree and character of the improvement is determined by the traffic density.

As a result of the work already done it is possible to travel on the main highways in all parts of the country at all seasons without serious inconvenience or delay; and the reduced gasoline consumption and wear and tear of vehicles, without regard to the saving in time and greater ease of travel, more than repay the cost.

AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS



HE Government of the United States has made grants of land and money to the States for the partial support of colleges and secondary schools in which agriculture, home economics, and other vocational subjects are taught, for maintaining agricultural experiment stations, and for conducting extension work in agriculture and home economics. The first State agricultural college was opened at Lansing, Michigan, in 1857. Congress in 1862 passed an act under which large tracts of land were given to the States to be sold for the establishment of permanent funds to maintain colleges of agriculture and mechanic arts. The leading object of these institutions was to teach branches of learning related to agriculture and the mechanic arts, without excluding other scientific and classical subjects, and including military tactics, to promote the liberal and practical education of the industrial classes. Under this and other laws, colleges teaching agriculture were established in all the States, and in 20 States these colleges of agriculture form part of the State universities. Under laws passed by Congress in 1890 and 1907 each State receives $50,000 annually as partial support for these colleges. The States have liberally supported the institutions, and at present the funds from the Federal Government constitute only a small part of their revenues.

FUNDS FOR EXPERIMENT STATIONS

The first State-supported agricultural experiment station was established in Connecticut in 1875, and other States soon followed this example. In 1887 Congress passed a law granting to each State $15,000 annually for the maintenance of an agricultural experiment station. This law was supplemented in 1906 by an act granting annually an additional $15,000, and in 1925 by a third act providing an increasing appropriation, becoming fixed at $60,000 annually in 1930, both of these appropriations to be

devoted strictly to the more fundamental, scientific work on agricultural problems. From that time on each State will receive from the Federal Government $90,000 each year for experiment station work. In the fiscal year ended June 30, 1928, the total received by the States from the Federal Government for the support of experiment station work amounted to $3,360,000, while the amounts received from within the States totaled more than $11,000,000.

Agricultural experiment stations have been established under Federal and State laws in all the 48 States. There are 50 of these stations, 47 of which are departments of agricultural colleges. In many States branch stations, maintained under State laws, are engaged mainly in the more practical experiments to meet special conditions. The experiment stations in Alaska, Hawaii, Porto Rico, Guam, and the Virgin Islands are supported from special appropriations, aggregating about $235,000 annually.

MANAGEMENT OF STATIONS AND COLLEGES

The general management of the stations is given by State laws to boards of trustees, which generally also manage the agricultural colleges. Usually these boards are appointed by the governors of the States, but in some States they are elected by the people. The trustees determine the general policy of the stations, pass in a general way on the equipment, work, and expenditures, and appoint the principal officers. The direct management of the station is committed to a director, who reports to the president or dean of the college. About 3,000 persons are employed in the work of the stations, of whom about 2,700 are scientists and technically trained persons. About 1,200 of these give part of their time to teaching or to extension work.

The experiment stations are partly housed in buildings used also by the teaching and extension departments of the colleges and also use portions of the college farms. At present more than 80,000 acres are devoted to their work. The stations also have many special buildings, experiment fields, farm machinery, animals, and equipment devoted entirely to research. (Figs. 88, 89, 90.) While the headquarters of the stations as a rule are at the agricultural colleges, many special investigations are conducted in different localities, including numerous experiments in cooperation with farmers.

FIG. 88.—Administration Building, State College of Agriculture, Iowa

The agricultural experiment stations, with the United States Department of Agriculture, constitute a national system of research in agriculture and home economics.

FIG. 89.—Cereal breeding work, Agricultural Experiment Station, Minnesota

FIG. 90.—Agricultural college buildings, University of Nebraska

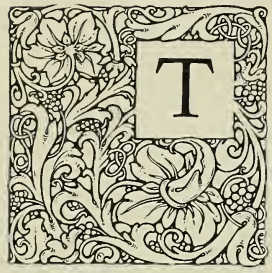
PUBLICATION OF RESULTS

The annual reports and popular and scientific bulletins published by the agricultural experiment stations are transmitted in the mails free of charge for postage. In 1927 the stations issued 2,012 publications aggregating 30,676 pages. These were distributed to more than 800,000 addresses on regular mailing lists in addition to the number sent out in response to special requests. Summaries of these publications are also widely circulated through the agricultural and other journals.

The Office of Experiment Stations in the United States Department of Agriculture administers the Federal laws granting funds to the State agricultural experiment stations, makes an annual inspection of their work and expenditures under the Federal acts, has advisory relations with them regarding lines of work, equipment, and personnel, prepares reports to Congress on their work and expenditures, and collects and disseminates information regarding similar institutions throughout the world. The Experiment Station Record, prepared in that office, contains summaries of the publications of the Department of Agriculture, the agricultural experiment stations and similar institutions in the United States and elsewhere, and of other scientific literature pertaining to agriculture wherever published, together with editorials and notes on developments in agricultural research and education.

COOPERATIVE EXTENSION WORK

GENERAL OUTLINE OF THE SYSTEM



HE cooperative extension service is a nationwide organization for rural education through which the United States Department of Agriculture, the State agricultural colleges, and local county extension organizations work cooperatively in extending the knowledge and use of better methods of farming and home making. This organization was established on a national basis by the Smith-Lever Act of May 8, 1914, a culmination of a general extension movement which had been spreading rapidly through the States for about 10 years.

When the Smith-Lever Act was passed, Congress estimated that the knowledge of agriculture and home economics that was available in the United States Department of Agriculture and in the State agricultural colleges and experiment stations was 25 years in advance of the practices commonly followed by farming people. It was, therefore, planned to establish a new corps of workers, known as county agricultural agents, home demonstration agents, and boys' and girls' club agents, who would conduct or supervise practical demonstrations of the latest and most successful farm and home practices. The act authorized the placing of extension agents in all agricultural counties where they might be needed and where the work could be financed.

The entire extension system is based primarily on demonstration work, which is a public display of a successful practice by a farmer, farm woman, boy, or girl under the guidance of the extension agent, for the benefit of others in the community who come to see the results. The dissemination of improved practices is further widened by the use of window displays, publications, motion pictures, exhibits, posters, circular letters, farm visits, campaigns, and the like. Farm men and women are selected from the local community to assist the extension agents in organizing and directing local groups of farm people and in extending to them the latest practices. These are known as volunteer local leaders and work without compensation.

COUNTY AGENTS

Extension work is concerned chiefly with the improvement of farming methods through the activities of county agricultural agents in about 2,300 of the 3,000 agricultural counties in the United States. The county agent's duties are primarily educational and advisory. He receives many calls for help or advice on a wide variety of problems, and his office is the natural center of the movements and community activities that are concerned with bettering agriculture and rural social conditions. The agent has much field work in addition to his office duties. He must bring

FIG. 91.—A county extension agent demonstrating poultry culling. Thousands of farmers have profited by following the improved practices recommended by cooperative extension agents

together groups that have common interests and from them must develop local leaders to aid him in organizing and directing extension work. The leaders carry on demonstrations on their own farms and assist four or five neighboring farmers in conducting like demonstrations. Thus, a well-organized county will have each year from 60 to 80 local leaders carrying on demonstrations and from 300 to 500 other farmers repeating the demonstrations on their own farms under the guidance of local leaders, all supervised by the county agent. Much of the county agent's effort is directed

FIG. 92.—An encampment of farmers and their families on the grounds of the Utah agricultural college. An event of this kind combines educational extension work with recreation

toward finding the local problems, needs, conditions, and practices, in order that he may plan with the people the most satisfactory and beneficial program of community extension work. (Figs. 91 and 92.)

HOME WORK UNDER WOMEN LEADERS

Home demonstration work has not yet developed to the same extent as the agricultural work, although it has made remarkable growth. Organization and methods are similar to those of agricultural work. Local women participate in determining community programs, and the work is based on the home or community demonstration under supervision of local leaders. The scope of the work embraces community and social activities and practically all activities of the home, including food production, preparation, and preservation; sanitation; and home management and furnishing. (Fig. 93.)

BOYS' AND GIRLS' CLUBS

Boys' and girls' club work is a distinct part of the extension system. In about 175 counties club agents are employed to devote their full time to the work, and in hundreds of other counties it

is supervised by the agricultural and home demonstration agents. It provides an opportunity for boys and girls 10 years of age and over to make demonstrations of better practices in farming and home making that will benefit both themselves and adults of the community. In 1927, the enrollment in 44,188 clubs was 249,553 boys and 370,159 girls. The work included more than 776,000 demonstrations in various phases of agriculture and home economics.

PERSONNEL AND COST OF THE WORK

This vast system of rural education employs in its field staff more than 5,300 highly trained workers, including 65 administrative officers, 422 supervisors, about 1,000 extension specialists, and local workers comprising 2,537 who are in county-agent work, 1,116 in home demonstration work, and 175 in boys' and girls' club work. These figures include 174 negro men and 118 negro

FIG. 93.—A farm woman explaining improvements which were made in her kitchen as the result of suggestions made by the home demonstration agent. Much energy and time have been saved by farm women through the rearrangement of their kitchen furniture, the installation of lighting, heating, water, and sewerage systems, and the adjustment of the heights of tables, sinks, and other working surfaces to the proper working height

women engaged in extension work with people of their race in the Southern States. In 1928 the total cost of the work was approximately $21,000,000, of which 36 per cent was appropriated by the Federal Government and 64 per cent by State and local governments. Recognizing the value of extension work, the National Congress passed a law in 1928 which authorized an increase of $980,000 in Federal funds for 1929 and of $1,480,000 for 1930 and thereafter.

SUMMARY OF RESULTS

Although the cooperative extension system has not yet attained its full growth, it is not too early to make some appraisal of its influence. Some of its outstanding results are:

(1) Cooperative extension work has vitalized the State colleges of agriculture and the United States Department of Agriculture as agencies of practical helpfulness for a large majority of the farming people of the country.

(2) Cooperative extension work has improved materially the farm and farm-home practice of the whole country. It has brought about the establishment of more profitable systems of growing and marketing farm products in many large agricultural areas.

(3) Cooperative extension work has been responsible for a rapid and general development of rural organizations.

(4) Cooperative extension work has established the self-conducted demonstration by the pupil as the method of teaching most applicable to the mass of the people. The demonstration, likewise, has proved to be the most convincing basis for appeal to those who can not witness or take part in the demonstration itself.

(5) Cooperative extension work has brought about among country people, both young and old, a pride in farm life and in extension association and achievement that is materially aiding in rural improvement and progress. The finding of capable, unassuming men and women on the farms and encouraging them to become leaders of movements and of men and women in their communities, counties, and State has been a distinctive extension accomplishment to this end.

DESCRIPTION OF THE EXHIBIT

CORN

THE left side of the exhibit of the United States Department of Agriculture pictures the production of corn. Colored illustrations show typical cultivating, planting, and harvesting scenes. On the right is a picture of a pile of corn, in the center of which is a chart showing graphically how the enormous corn crop is used. Through the archway in the center of the exhibit structure one sees a corn-harvesting scene and at the sides of the exhibit are glass cases in which are displayed some of the outstanding types and varieties of corn and some of the commercial grades of corn.

WHEAT

Typical production and marketing scenes in connection with the United States wheat crop are shown on the side panels of this exhibit. In the center one may see through the archway a picture of a "combine" harvester in a large wheat field. The types, varieties, and commercial grades of wheat are represented by actual samples under glass.

COTTON

In this exhibit the United States official grades of cotton are displayed on a special framework in the center of the exhibit. Three bales of cotton illustrate different types of bales and bale coverings. Looking through the archway in the center one sees a typical cotton-harvest scene and on the right and left sides are colored pictures showing the production and marketing of cotton. Outstanding types of cotton are represented by samples in glass cases.

TOBACCO

The feature of this exhibit is a mechanical cigar smoker which smokes four cigars at the same time with equal suction so that a comparison can be made of their burning qualities. On each side of this feature are colored illustrations showing typical scenes in

connection with tobacco production and marketing. Some outstanding varieties and grades of tobacco are shown in glass cases. Cigars, cigarettes, chewing tobacco, pipe tobacco, and other forms of tobacco are displayed to show how this great crop is utilized in the United States.

LIVESTOCK HISTORY AND DEVELOPMENT

Through a window in the center of this exhibit one sees a Spanish ship riding at anchor and moving slowly up and down with the waves. Cattle and other livestock are being driven ashore, thus representing the introduction, into the United States, of its first livestock, which history shows was imported from Spain. On the left of this scene are large illustrations showing typical herds of beef cattle, together with scenes on the range and in the feed lot. On the right the marketing of livestock is depicted. In the foreground of the exhibit is a glass case containing a likeness of the Spanish jack which was presented to George Washington by the King of Spain. This is thought to be the beginning of mule production in America, which has grown to such proportions that the United States now exports thousands of mules to Spain each year.

MEAT CUTS AND LIVESTOCK SANITATION

Looking through a window of this exhibit one sees three choice cuts of meat, as follows: Prime rib of beef, loin of pork, and lamb rack. These cuts, which are in the form of wax models, show the high quality of meat in the United States.

At the sides of the exhibit are shown the safeguards against diseases and insect pests which this country has placed about its livestock.

DAIRYING

On the left of this exhibit are shown dairy herds of the more common breeds in the United States, including Ayrshires, Guernseys, Holsteins, and Jerseys. On the right of the exhibit the marketing of milk is pictured.

WOOL

A feature of the wool exhibit is a set of United States official wool standards, shown under glass. The production and marketing of the wool are portrayed pictorially and are accompanied with figures on the production and exportation of wool.

SWINE

The care and management of swine, as practiced in the United States, are shown pictorially, and important steps in the marketing of hogs are presented by means of enlarged photographs.

POULTRY

An interesting part of the poultry exhibit is a model of a good type of laying house built on a scale of about 2 inches to the foot. This house is equipped with modern conveniences for laying hens. The production and marketing of poultry are shown by large colored pictures.

ROADS

The development of roads in the United States is shown by means of contrasting scenes, with paintings on the canvas background to blend with the foreground material. Looking through the window at the right one sees a group of models showing a family traveling in a "prairie schooner" across the American prairies toward the West. There are, of course, no roads and the going is rough and tiresome. Looking through the next window one sees a modern, hard-surfaced road over which busses, trucks, and pleasure vehicles are moving with ease and speed, thus facilitating communication and commerce.

AGRICULTURAL EXPERIMENT STATIONS

In the center of this exhibit is a map about 5 feet wide on which is shown the location of the principal experiment stations in the United States. The growth of experiment-station work, on the basis of the number of people employed, is also emphasized in the center section. On the left wall of this exhibit are views of work carried on at different stations throughout the United States, while on the right may be seen typical activities of insular experiment stations. This exhibit serves also as headquarters for the representative in charge of the department exhibits.

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